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ComputerWeekly

Thursday, February 10, 1983

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Fresh attack on education cuts

by Kevin Cahill

THE government has come under renewed attack from the highest levels of the UK computer industry and academia over its education policy.

David Baldwin, UK managing director of Hewlett-Packard, which is currently creating 1,000 jobs in the computer industry at Bristol, said that his company is concerned that there are now more students than places on computer science courses at UK universities and polytechnics.

Baldwin acknowledged that HP would be talking directly to the government on the issue but warned that "time is not on our side."

By the mid-80s Baldwin said 50% of all Hewlett-Packard's new recruits would have to be graduates, with all the remainder educated to at least A or O-level standard.

Baldwin pointed out that Japan and the US were both producing more than 2.5 times as many engineers as the UK, on a comparative basis.

Last year Japan graduated 87,000 engineers, the US 63,000 and the UK a mere 13,000.

Compared with Japan the UK should have produced 43,000 engineers. To keep in line with US levels the UK would have needed 27,000 engineering graduates.

Although Baldwin was lavish in his praise for the standard of recruit that Hewlett-Packard had so far obtained, he said that the company was concerned about the "quality" of some of the courses offered.

He later explained that he had used "quality" in terms of the relevance of the courses to the needs of companies like Hewlett-Packard. He did not intend to imply failure to meet any particular set of standards.

Baldwin's points, coming as they do from the chief executive of one of the UK's largest computer companies, directly echo misgivings about the current course of computer education expressed by ICL's managing director Robb Wilmot late last year.

Wilmot told the British Computer Society that the drop in enrolment on computer science courses was serious.

According to Wilmot, less than 10% of the basically inadequate number graduating in computer science do so in commercial data processing.

A spokesman for the Department of Education and Science said that the number of children doing O and A education in computers had gone up exponentially in the past four years. But for many there is nowhere for them to go when they get their qualifications.

Dr John Beishon, director of the South Bank Polytechnic in London, the biggest poly in the country with over 17,000 students, describes the government's policy as "crazy".

He says that while the government has belatedly recognised the need for more funding for information technology, he considers it "too little too late."

BALDWIN . . . "Time is not on our side".

System cuts 1,800 names from council housing list

by John Kavanagh and our Parliamentary Correspondent

HUMAN error and a system design fault deleted nearly 1,800 council tenants' names from the house exchange system run by the Computel bureau for the Department of the Environment. Housing Minister John Stanley told the Commons last week that the incident involved people who applied for home swops over [illegible] days last July.

The error cost Computel "six man weeks" of programming work to ensure it could not happen again, according to Derek [illegible]man, managing director of Beaufort Computer Services, which bought Computel in December. Operating procedures have also been tightened.

The problem arose because tenants can list several areas they would like to move to on their application forms.

The system did not check the correlation between the number of people on the register and the total number of areas listed.

During a run last July the system had to be restored and the wrong files were mounted, excluding the latest 1,800 applicants. The lack of a control program meant this error went undetected.

Philip Stevens, head of Computel, said the company had not paid compensation but had made the changes and re-entered and processed the deleted data free of charge.

He added that Computel received "loads of congratulatory letters" from tenants about the system. About 49,000 people had used it by the end of 1982.

Software exports under fire

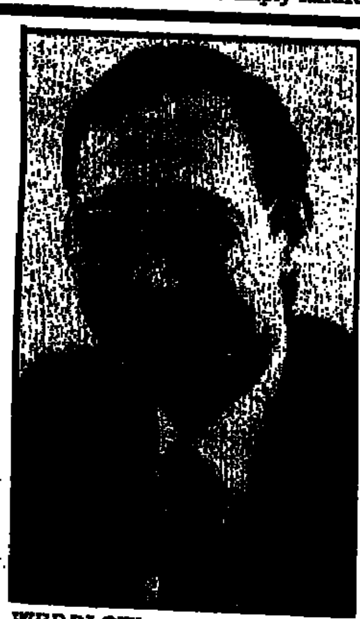
by John Kavanagh

THE software industry and the government have been slammed over the UK's poor software exports record – by one of the industry's own members.

Scicon managing director Warren Werblow last week told the Parliamentary Information Technology Committee that although the government had been successful in attracting overseas companies to set up software and manufacturing centres in the UK it should pay attention to the UK's home-bred information technology industry.

He pointed to the withdrawal of government support for the loss-making software marketing company Insac, and called for full backing for the Department of Industry's Alvey Committee recommendations on future computing research, plus extra funds for the Software Products Scheme.

He went on, "As a country we haven't really made much headway in recent years in software exports. British software has a deserved reputation for quality but can we really say we've capitalised on this, with exports running at £50 million and a home market of about £1 billion?"



WERBLOW . . . Pay attention to UK industry.

And as minicomputer leader Digital Equipment prepared to announce the building of a £7 million UK software centre (see front page), Werblow added, "We've had foreign companies taking advantage of our relatively low salary structures either to tempt away our software talent overseas or to staff software laboratories they establish in the UK. Are the revenues so generated to be regarded as British exports?"

■ See Leader Comment — page 15.

LINE NOISE

THE government refuses to say categorically that the Department of Industry's Computer Aided Design Centre will not pass into overseas ownership now that it is being sold off – but if the likes of US minicomputer firm Prime, which recently took over the computer-aided design specialist Compeda, hopes for another coup, it should not disregard the staff's reactions. "We're keeping an eye on the situation," said Nick Ballard, representative of Clive Jenkins' white-collar union ASTMS, which has nearly 70 members among the 150 staff. "This is a political hot potato and we don't think the government wants egg on its face over the sale of its prime centre of excellence in this field."

SCOTTISH disc maker Rodime could well have landed the plum contract to supply IBM with Winchesters for Greenock-built Personal Computers. A hard disc version of the PC is not far off, and the choice of a local firm would seem to be logical. Rodime may be set to score lots of points with the IBM deal, but other users of Rodime products aren't so happy. Milton Keynes-based Pericom has stopped using Rodime drives. Pericom R&D manager Dave Wilkinson told Computer Weekly that the Rodime drives produce too much heat. "They work OK, but keeping the whole unit cool is a problem, so we've switched to American drives."

'Blue' row leads to BT rival

by Donald Kennett

A DISAFFECTED Prestel information provider has started a rival service.

Ivan Siou was at the centre of a row last year when his company, Track 2, carried advertisements for massage parlours and saunas in its Blue Pages database on Prestel. Complaints from the public led to questions being asked in the House, acid comments from campaigner Mary Whitehouse and pressure from the Viewdata Industries Association for the removal of the advertisements.

British Telecom found it hard to explain that it felt no more responsible for the information carried on Prestel than it did for the contents of telephone calls.

Now Siou has started another company, called Online Viewdata Marketing, which will use IBM's viewdata bureau service in Warwick and its network of eight concentrators around the country to bring his "electronic yellow pages", also called Blue Pages, to individual consumers interested in entertainment, travel, food and services, including licensed saunas.

About £250,000 has been put into the operation and it already claims 2,000 advertisers.

A major selling point will be a magazine and index designed to enable users to go straight to the information they want.

Clark says OVM has signed up an unidentified US company to provide a link into a Canadian network which includes translating the information into a form that is compatible with Canada's Telidon system.

Disc problem 'has cost Storage Tech $17m'

by Howard Karten and Kevan Pearson

ONE of the leading suppliers of IBM compatible discs has suffered a double setback in recent months.

Storage Technology is reported to have spent $17 million correcting a problem with its 8650 double density disc drives. And late last year the company announced that it was to drop the development of its 8370 drive, which was to compete against IBM's 3370 in the small systems market.

STC replaced about 2,000 of its 8650 devices, compatible with IBM's 3350, when some of them began to fail after between three and six months in the field.

A spokesman for STC explained that the problem was caused by failure in the magnetic coating on the discs as a result of a crash manufacturing programme by STC to meet the increased demand generated by IBM's failure to bring its 2.5 gigabyte 3380 to the market on schedule.

The problem, called "particalisation" in the trade, involves the break-up of the magnetic surface of the discs themselves. IBM is believed to have encountered a similar problem with its 3380s.

The problematic 8650s were not made by STC but by an outside sub-contractor, said a spokesman. The firm was not named.

STC dropped its 8370 programme ostensibly because of declining demand for 3370 type products.

A spokesman for STC explained that the company planned to divert resources to its 8380 programme, which aims to produce an IBM 3380 compatible product by the end of the first quarter of 1983.

DEC puts faith in UK

■From front page

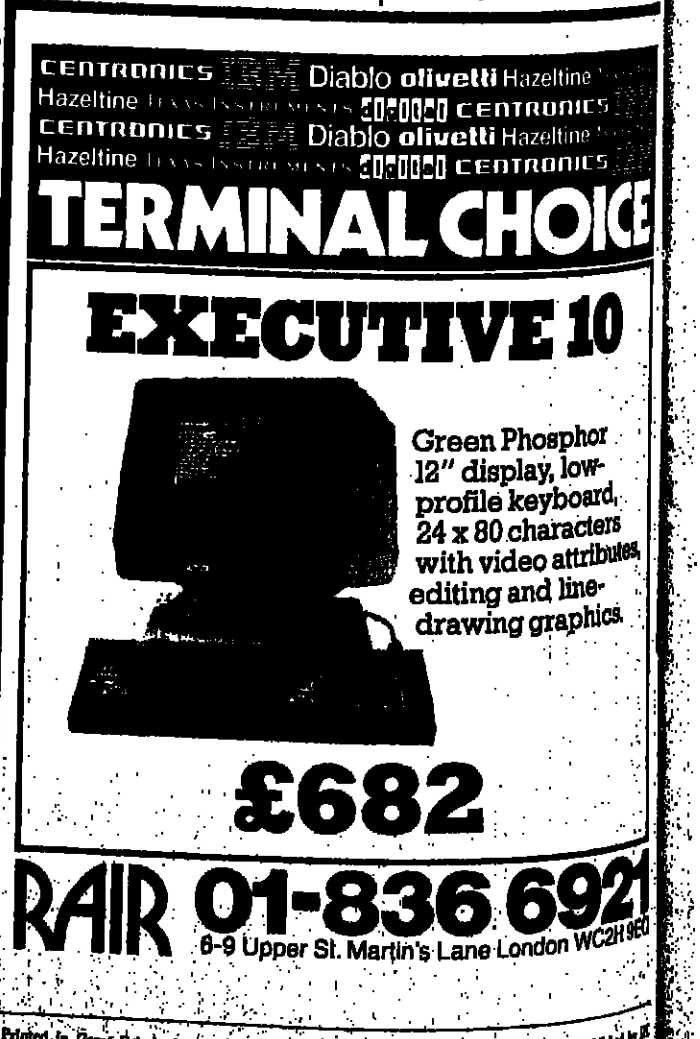
people," he said.

As well as taking on graduates DEC is talking to universities about office automation research and is close to signing agreements with some of them.

The new centre will build full-scale office automation systems as test beds for ideas and software, both within DEC and with its customers. Barbe said DEC had already set up one of the world's biggest electronic mail networks, with 15,000 users, for its own use.

He added, "Many of the ideas developed and tested by the centre will be right on the fringe of the possible."

Software engineering manager Dick Davies said human interfaces would be one of the key areas for research.



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Computer Weekly

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BLUMENTHAL . . . Narrowed choice to Mitsubishi or Hitachi.

Burroughs takes Japanese route into PCM market

by Kevin Cahill

A MAJOR new entrant to the IBM plug-compatible market is likely to emerge as Burroughs prepares to sign a key mainframe supply deal with one of two Japanese companies.

Following a ten-day tour in Japan, Burroughs' chairman Michael Blumenthal is believed to have narrowed the choice to Mitsubishi or Hitachi.

Burroughs already has several links with IBM compatible supplier Hitachi for the supply of optoelectronic (fibre optic) equipment, facsimile machines and more significantly, for the supply of small business systems.

This makes Hitachi a strong contender for a deal according to some Japanese commentators, but they also suggest that Mitsubishi, now that it is about to start production of the IBM compatible mid-range mainframes (originally revealed in Computer Weekly in December 1980) is still a possible choice for Burroughs.

Burroughs itself is about to start a major new manufacturing facility in Japan, and the idea of a parellel deal with Mitsubishi has been raised with Blumenthal.

Mitsubishi said originally that the company intended to invest $100 million in the production of a twin processor machine, one processor to run the IBM instruction set, the other to run the instruction set for Mitsubishi's own Cosmos range based on the Xerox Sigma line, which is no longer produced in the West.

Hideo Ohta, director and deputy general manager of the electronics products and system group of Mitsubishi Electric Corp said the aim was to produce a range of machines in the five to eight million instruction per second class with IBM compatibility based on an independent Mitsubishi operating system.

Mitsubishi currently supplies IBM with a range of colour VDUs,

■ Turn to back page

NEDO working party calls for an urgent national policy

'Act now — or UK will be out of IT by 1990'

by John Kavanagh

THE UK could be out of the information technology business by 1990 unless the industry, the government – and users – act now to make UK information technology companies more competitive in world markets.

Yet users see UK suppliers as preoccupied with technology rather than customers' needs, unable to provide complete systems – but unwilling to co-operate – and bad at marketing and support.

These gloomy views emerge from two reports from the influential National Economic Development Office's information technology sector working party and its user panel.

The information technology working party, made up of senior people from industry, unions and the government, calls for a national policy to co-ordinate the work of the UK industry which, it says, is relatively small and fragmented at a time when other countries are developing high-volume, broadly-based programmes.

The working party, chaired by Dr James Merriman, says the UK has a trade deficit of £150 million a year in information technology. This could rise to £1,000 million by 1990, and could be more as the easing of British Telecom's monopoly brings in more competition. The UK should aim at least to break even by 1990, which implies that it must more than maintain its current 5% share of the world market.

But, says the report, published on Tuesday, the UK seems unable to take advantage of a world market which is expected to grow from £55,000 million today to £100,000 million in 1985. The UK's share is likely to fall as the US tries to consolidate its dominance in the face of the threat from Japan.

The working party calls on UK information technology firms to agree on international connection standards and work together on research. Manpower planning should be improved and there should be closer ties with universities and govt training bodies.

Marketing emphasis should move from technology to providing a service. And the industry should work with the government to set up "shop window" projects.

Government and public bodies should agree on common goals to support information technology. Public purchasing should promote high quality and the use of international standards. And a five-or 10-year plan should be set up in the wake of Information Technology Year to support the industry through projects ranging from promotional and demonstration schemes to the development of a complete industry infrastructure.

But the "Back Britain" idea should extend to private companies, which should be prepared to pioneer new applications. Users should "actively support the development of an indigenous internationally-competitive industry" by using international standards, providing shop windows for UK products and helping suppliers with advance information on needs, practical experience and feedback on product performance.

Alan Benjamin, a director of UK software house CAP and a member of the working party, said users, especially public bodies, should look beyond their organisations' needs when evaluating systems. "The balance of payments will be affected if they buy a foreign product," he said. "This is a fuzzy area for private companies but not for the public sector."

But users do not agree, according to the user panel report, which has not yet been published. UK firms are too concerned with technology. They have some excellent products but are bad at supporting them. And they are conditioned by the public sector market and are thus "commercially ineffective."

The user report says users look towards companies which can supply and support complete systems – and this favours multinational suppliers.

Leader Comment — page 15

MERRIMAN . . . "IT trade deficit could rise to £1,000 million."

Cord ties up Zeus in 'out of blue' offer

REAL time technical systems house Zeus Hermes has been bought by Cord Designs of Staines from the Enterprise Systems Group which had owned it for less than a year. Enterprise chairman Peter Rhodes-Dimmer said they had lacked the management resources to put the right amount of effort into Zeus.

"We've had a tremendous increase in other business areas and we felt that Cord's offer out of the blue ought to be accepted," he said.

Newbury jobs

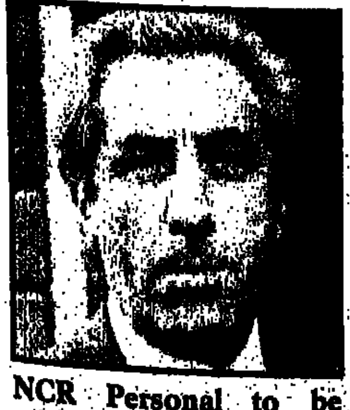
A FACTORY expansion of 30% is to create 100 new jobs at Newbury Data Recording, the UK's biggest peripherals manufacturer. And the publicly-owned company is considering moving into the US with its matrix printer range. Marketing manager John Pether said, "Our US competitors have been hit by the changing dollar exchange rate, which means we can offer good prices against them."

Cullinane grows

SOFTWARE house Cullinane Database Systems saw its revenue shoot up 57% in the six months ended October 1982. The growth to over $34 million in the half year was well in line with the annual goal of 50%, according to UK managing director Vic Morris.

Manpower study

A £15,000 EEC study by the Institute of Manpower Studies to examine manpower problems in the European semiconductor industry has received a £5,000 boost from the Manpower Services Commission. It will be used to examine how effectively graduates of specialised electronics courses in universities are used by industry.



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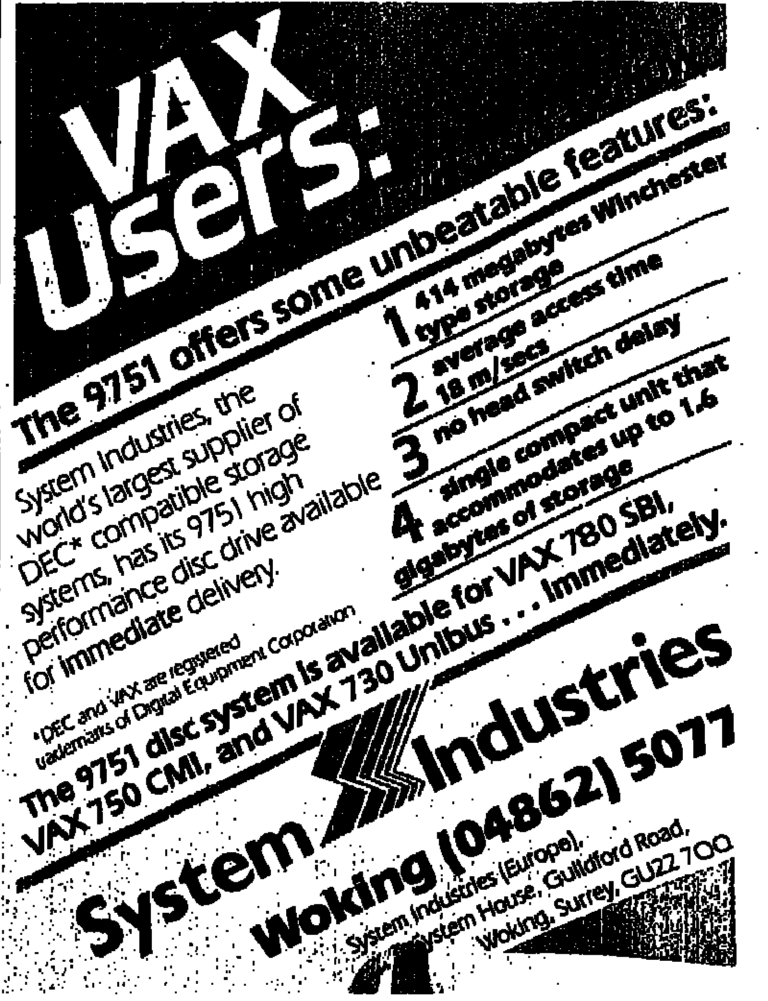

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BT unions slam govt 'secrecy'

by Donald Kennett

BRITISH Telecom unions have slammed the latest government measures to control the telecommunications industry which they say make a nonsense of the democratic process.

A strongly worded statement from the BT Unions Committee, which represents six BT unions, attacked the government for commissioning in secret a report on how to limit any ill-effects of BT becoming a private company with a dominant market position.

The recommendations of the report, by Professor Stephen Littlechild of Birmingham University, had been largely accepted by the government with no discussion in Parliament or consultation of users, the union statement said.

The plan to keep some of BT's prices below the level of inflation for at least five years was a reversal of the policy to free BT from government interference. And opening international services to competition would cause consternation to other countries which rightly regarded such competition as bad for customers as a whole, it added.

The BTUC represents the Post Office Engineering Union, the Union of Communications Workers, the Society of Post Office Executives, the Civil and Public Servants Association, the Communications Managers' Association and the SCPA.

The Opposition parties in Parliament have been delaying the passage of the Telecommunications Bill, under which BT is to be sold to private investors and an Office of Telecommunications is to be set up to control the industry.

Filibustering by opposition speakers in the committee stages of the Bill was expected to be brought to an end this week by a guillotine motion in the House of Commons that would impose a strict schedule for the discussion of each of the Bill's 84 clauses. So far discussions have only reached Clause Three.

BT's reaction to the Littlechild report was "pleasant surprise that he had rejected the worse forms of regulation".

BT chairman Sir George Jefferson said, "The broad thrust of the Littlechild report is consistent with the desire we have, and with the view of the Secretary of State, that BT should be able to operate in an environment that is dynamic. With that goes some element of competition.

"The timing and phasing should be such that such a major transition can be sensibly accomplished and that the economics of the network are not put at risk.

"In the international situation one is not starting from a non-competition position. But for many years it has been the policy of BT as an international operator to have regard that there is no major danger of damage to international routes. To that end it hasn't gone for the cheapest route, which is usually satellite, but has gone for diversity. If it is exposed to competition it might have to increase the risk factor."

He added, "British industry has 90% of the market for submarine cable. If there is competition we might have to seek other ways of helping industry.

Lambie (left) and founder managing director Rupert Bayfield drink to the next 10 years.

Firm that called a halt to 'the old-boy network'

by John Kavanagh

A COMPANY which claims to have turned contract staffing from an old boy network into a professional business service celebrates 10 years in the computing industry this month.

Computer People also claims that its £8 million annual turnover puts it at least £2 million ahead of other companies specialising solely in contract and permanent staff recruitment. Pre-tax profits run at about 7% of turnover. About half the revenues come from its offices in the US.

"When we started the contract business was nothing like today," said founder director Anthony Lambie. "Ourselves and Trident Computer Services, formed about the same time, made it into a proper business. Previously it was a case of personal recommendation, like an old boy network.

"Since then the business has established a reputable professional image."

Lambie said there were probably over 100 contract staffing firms in the UK. Computer People was also the biggest in terms of numbers of people out on contract – 400 on average.

These are drawn from a database of 10,000 names held on six Comart microcomputers.

Lambie added that the recession had changed the contract business, but not badly hit it.

Philips wins £12m French phones deal

DUTCH electrical group Philips to supply 100,000 terminals to a French Post Office project to computerise telephone directories. French phone subscribers will eventually receive a computerised replacement for their phone directories free of charge. The £12 million worth of terminals will be delivered by Philips over the next year.

And Philips has won an order for 600 terminals for the New Zealand Post Office. The order is for Swedish-made PTS6000 terminals.

Personal boom

PORTABLE personal computers are set to boom over the next few years. Hardware shipments will increase tenfold by 1987, reaching five million units worldwide, says Portia Isaacson, president of US market-watchers Future Computing, while software for the machines will show an even bigger increase, from 650,000 units last year to over ten million in 1987.

Comment invited

THE North American Presentation Level Protocol Syntax (NAPLPS) for viewdata and teletext, which started life as a controversial proposal from American Telephone & Telegraph at Videotex 81 in Toronto, has been published for public comment by May 21 on its way to becoming a US and Canadian standard.

Schools quiz

CONTROL Data is jumping on the schools quiz competition bandwagon, but with a difference. The pupils answer the questions and two teachers get the prizes – a course each on Plato, Control Data's computer-based training system. The schools are all in North London, and the final will be in early March.

Viewdata deal

THE Volkswagen-Audi Group has installed a 500-terminal viewdata network to handle communications with its dealers. Prime contractor for the head office system was Comdial Communications Systems, formerly Menzies Communications Systems, which had previously implemented a voice response system for the company. Viewdata software was supplied by [illegible] and the terminals by Bishopsgate Terminals, the company set up to supply terminals for the Stock Exchange's Topic viewdata system in 1978.

Racal-Milgo

RACAL-MILGO'S orders from British Telecom for high-speed modems (mostly 9,600 bit-per-second devices) reached a record £6.5 million for the past year. Our story last week about Micom-Borer winning a £2.4 million order from BT stated incorrectly that Racal had been dropped; BT confirms that Racal-Milgo continues to be a major supplier of high speed and other modems.

£200,000 for Computer Peripherals

by Kevin Cahill

LONDON-BASED Computer Peripherals has received a £200,000 injection of share capital from UK venture capital group Abingworth. This will give Abingworth a 20% stake in the company, which won the exclusive UK distributorship for Telex Corp's IBM 3270 compatible terminal from GCS last year.

Computer Peripherals managing director Eric Lipscombe said the money would be used to help expand the business which has already grown to over £2 million in the three years since it was founded.

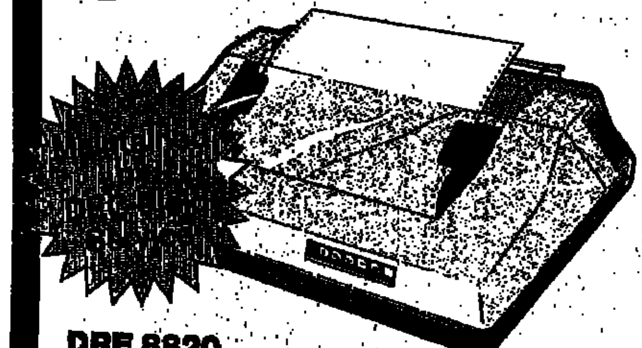
Lipscombe decided to look for outside finance last September when the business was beginning to expand.

Computer Peripherals accountants put the company in touch with a group of investment institutions and several made offers, but the Abingworth proposition was the best, according to Lipscombe.

Computer Peripherals maintains a close link with the former Telex Corp subsidiary GCS, based in Ealing.

The management of GCS bought the company out of Telex last year and with it the Telex distributorship.

Following extensive negotiations between Telex, GCS and Computer Peripherals, CP emerged with the distributorship and GCS got all the maintenance and engineering sub-contracts.



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Former Kode managers start up microcomputer maintenance firm

by Robert Parry

BREAKAWAY managers from Wiltshire-based Kode Services have set up a new third party micro maintenance company. John May, ex-managing director of Kode Services, and Clive Marklew, promoted to general manager at Kode Services by May last Christmas, are heading their own company and aim to offer a wide-ranging service for a spread of popular micros and peripherals. The company is provisionally called Micro Systems Maintenance.

May left Kode Services at the end of January after eight years with the company, three and a half of them as managing director. "It could have been a happier parting," he says. "It was done without many words spoken."

His reasons for leaving centre around a change of management style within the Kode International group, of which Kode Services is a profitable subsidiary.

Micro Systems Maintenance will not be prospecting Kode Services' existing customers, and May does not see the defections from Kode affecting Kode that much. "We are not looking for a fight, there is plenty of custom for everyone," he said.

This view is shared by Kode International's chief executive, Peter Smith, who is acting managing director for Kode Services. Smith took over the reins as chief executive last September.

May insists that the setting up of the new company was not preconceived. He was phoned within hours by people who had recently left Kode Services, or were about to do so, and the idea of setting up the new maintenance company was floated.

"It was an eye-opener how quickly it could be done – and how helpful friends can be," said May. Financial backing, £75,000 from the bank and £25,000 raised by May and Marklew, the directors of the new enterprise, was in place within 24 hours according to May, and there are plenty of private backers ready to put some money in.

MAY . . . "Not looking for a fight."

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JACKSON . . . Starting from scratch again.

Hitachi fined $10,000 in IBM secrets case

by Kevan Pearson and Howard Karten

HITACHI last week pleaded guilty to conspiracy charges in one of the US trade secrets cases involving the alleged theft of design information from IBM. The company was fined the maximum penalty of $10,000.

The company was charged in June 1982, after a seven-month investigation by the FBI, with conspiring to steal confidential design information from IBM on IBM's latest hardware and software products – the 3081 CPU and its MVS/Extended Architecture (XA) operating regime.

At the time Hitachi – which was indicted with Mitsubishi in a separate charge – professed its innocence, and still does, though guilty pleas were put before the court in California last week.

Peter Flemming, Hitachi counsel, told reporters that Hitachi had pleaded guilty in exchange for an assurance from the US Justice Department that no further charges would be brought in the case.

The company at the time admitted to authorising payments totalling over $500,000 for IBM design documents, but added that it did not know that documents were stolen. The company still maintains this position.

This plea bargaining is seen as an attempt by both sides to avoid more serious consequences of a full-scale industrial spying charge, including a worsening of general trade relations between the US and Japan.

Frank Jens, an analyst with the Boston-based Yankee Group consultancy, believes the plea bargaining was an astute move by Hitachi. "The last thing Hitachi wanted was a big court case, especially given the trade and political climates between the US and Japan at the moment."

Jens does not think the plug-compatible business will be badly affected by the case. "The uncertainty in the case has been alleviated by Hitachi's plea. People have short memories. In 12 months it could be forgotten."

Mitsubishi says it will maintain its "not guilty" plea. But Jens points out that the hearing is not scheduled until July 1983, and the company could change its mind in the light of the aftermath of Hitachi's guilty plea.

Two Hitachi employees pleaded guilty at the same hearing as Hitachi and were fined $10,000 and $4,000. The cases against 11 other Hitachi officials, nine of whom are now in Japan will continue, but without guilty pleas from the defendants. Hitachi maintains that its senior executives knew nothing about the alleged illegal activities.

The major remaining obstacle to a full settlement of all cases is the civil suit brought against NAS, its parent company, National Semiconductor, and Hitachi, by IBM.

The case continues, though the parties concerned are negotiating for an out-of-court settlement. The trial judge ordered a 60-day delay in the proceedings to enable them to get together.

Hitachi is vigorously pursuing an out-of-court settlement, according to reports from Japan.

The feeling in the US is that an agreement will be reached between IBM and the defendants.

NAS president David Martin admitted that the case had driven his company into the red over the recent past, though he expects NAS to make a full recovery in 1983. It was partly this which led NAS to stop its own computer manufacturing operations.

The case is really a statement from IBM that it is no longer a slumbering giant, content to let the PCM companies prey on its captive market, says Jens.

Forty jobs lost in software shutdown

by John Kavanagh

THE recession has claimed a new victim in UK bureau and software group Jackson Associates. The software side of the company has closed with the loss of 40 jobs but the receiver has kept the 40-strong bureau operation together in the hope of finding a buyer.

Meanwhile founder and managing director Barry Jackson and his wife Sue, the company secretary, have left to start again in business.

Barry Jackson said he had no firm plans but would probably start from scratch with his own software and consultancy firm. Sue Jackson is setting up a word processing bureau with some friends and her husband may form a software division under the same company name.

"Business was fine until last year," said Sue Jackson. "But because of the recession a lot of our customers were taken over or went bankrupt. This meant we had a lot of staff with no work to do."

The receiver, Christopher Morris of Touche Ross, said the company had also been charging wrongly. "It appears that work was obtained at levels which could not support the company," he said.

Jackson Associates was formed in 1973. It moved into the bureau business by taking over Scan Data Centres in 1980. A year later it announced a move from Honeywell mainframes to ICL with a £500,000 order for two 2946s. Sue Jackson said the company's problems could not be traced back to that expansion or to the change of equipment.

Jackson Associates is backed by some blue-chip companies, including Blue Circle Industries with 26 per cent, the Lloyds Bank pension fund and merchant bank Robert Fleming.

Before the slump it was growing rapidly and more than doubled its profit in 1980 to £189,000, while turnover reached £2.2 million.

CP/M system rewritten in 'C' language

by George Black

DIGITAL RESEARCH has rewritten its CP/M operating system in "C" language to make its software more portable.

The first micro to offer it is the American Sage machine, distributed in this country by the Bristol firm TDI.

The new version of the popular operating system is called CP/M-68K and is the first of a family of CP/Ms promised in "C". A version called CP/M-Z8000 will probably be shipped next month for the Zilog-chip machines.

Digital Research director of European operations, Paul Bailey, said that in future they would write source code in "C" wherever possible because it was ideal for portability.

"I've never seen CP/M and Unix as competitors," he added.

Previously, source code has been mostly in Assembler.

"We want to cut down the number of versions we have to support. There are now a dozen or so, which is creating a maintenance problem," said Bailey.

BAILEY: "Ideal for portability".

CP/M-68K will allow CP/M systems to run applications written in "C" for a Unix environment. The users to benefit will be those with machines based on Motorola's 68000 chip, such as the new Apple Lisa, the Fortune and Hewlett Packard's 9800 series.

Sage, which appointed TDI as its UK distributor last September, claims its 68000 micro is four times as fast as other 16-bit machines such as the IBM and the Sirius, and 14 times faster than the 8-bit Apple 11.

With CP/M-68K, Digital Research is to ship a "C" compiler and a Unix Version 7-compatible run-time library.

"There is a growing amount of software being written in 'C' and our move will allow all these programs to be more widely used," said Bailey.

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FLEET . . . "It will open up new horizons for NCR"

NCR makes its personal move

by Robert Parry

NCR last week made its bid to cash in on the personal boom, with a European product.

It launched a series of 8- and 16-bit machines, Decision Mate V, designed and built by NCR's German subsidiary – the first time a US manufacturer has turned to Europe for its micros.

"This is our first venture into the personal computer market," says NCR UK managing director Rex Fleet. "It will open up new horizons for NCR."

The company hopes that Decision Mate V will expand its user base beyond the small business systems market it already caters for with micros and minis like its 9010 and 9020 ranges. But it is under no illusion that it will get more than a modest share of the 75,000 personal computers of this type that it estimates will be sold in the UK this year.

The NCR machines use the most popular 8-bit and pseudo 16-bit processor chips, the Z80 and 8088 respectively, coupled with the common clutch of MS-DOS and CP/M family operating systems. They will be sold by a dealer organisation that NCR is establishing through a new Independent Marketing Division, as well as by direct sales and through OEMs.

Alongside the machines, which start off at £1,825 for an 8-bit only, 64K machine with monochrome graphics and twin floppies, NCR has announced a local area network to link them together, and a Winchester disc file sharer called Modus. The network is Corvus Systems' Omninet with an NCR label, and will cost between £300 and £400 per connection. Modus will be about £7,000 or £8,000. Both are due in June.

The features of the series that NCR reckons will appeal to business users about to venture into personal computing for the first time, centre around ease of use. Peripheral and memory expansion is via external bus plugs, which do not require the users to delve into the innards of the machines.

Darkcrest goes ahead with new Vax product despite DEC lawsuit

by John Kavanagh

LONDON systems house Darkcrest has stepped up its attack on the Digital Equipment market despite its multi-million pound legal battle with the US minicomputer giant. DEC specialist Darkcrest has launched a communications controller for the US firm's Vax range of 32-bit superminis.

Meanwhile Darkcrest and DEC's UK managing director, Darryl Barbe, have confirmed that both see the lawsuit as a fight to the finish, with no pulling out before the case gets to the courts.

Darkcrest expects to sell between 50 and 100 of its new single-board communications controllers every year. The products are made in the US by Emulex, and Darkcrest is the UK distributor.

Two communications controllers have been launched. The CS21/F handles 16 asynchronous lines with partial modem control and speeds of up to 19,200 bits a second. The CS11/F provides full modem control on up to 64 lines.

Both controllers can multiplex 16 lines through one or more modems to 16 remote sites, a feature claimed to be unique. Darkcrest also scores over DEC in that the products are available across the Vax range, whereas DEC's eight-line equivalent is only offered with the new Vax-11/730, the smallest machine in the family.

Prices start at £2,300 for a 16-line controller.

DEC's lawsuit against Darkcrest came last summer when the US firm won a High Court order allowing it to search Darkcrest's premises for "evidence of misappropriation" of systems software. It is claiming substantial damages for alleged copyright infringements, but Darkcrest says it has not pirated DEC software and is seeking exemplary eight-figure damages in return.

Last week DEC's Barbe repeated that the company had clearly defined policies covering the use of its software by users and systems houses. "These policies are followed by virtually all our customers," he said. "We will protect our rights anywhere in the world."

But Peter Williams, operations director at Darkcrest, said, "We have done our utmost to ensure DEC gets all the money it is entitled to from our sales."

Traderpoint group formed

COMPUTING Services Association has formed a special interest group for member companies with ICL Traderpoint agreements. But at the group's inaugural meeting last month, interest was not much in evidence – only seven of the 280 Traderpoint firms turned up.

"People aren't too interested in coming to meetings," said CSA director Doug Eyeion. "They're too busy making money."

According to Eyeions, the thinking behind the formation of the group is to provide a focal point for CSA Traderpoint dealers, enabling a unified approach to top ICL management. But he is wary of predicting a rosy future for the group.

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"The main trouble is convincing the smaller fleet operator that he needs a computer".

Software system to 'police' truck drivers

by Andrew Thomas

THE Department of Transport is to use a British system to police truck operators. Birmingham-based Lucas Kienzle has won an order to supply 11 of its M-FOS modular fleet organisation systems to the DoT. These will be used to check tachograph charts for forged entries.

The M-FOS system is written in Microsoft Basic for running under the CP/M86 operating system. Lucas Kienzle supplies a complete turnkey package, based on the Sirius 1 microcomputer, but marketing manager Dave Michell says the package will also run on the IBM Personal Computer and the Victor Sirius lookalike.

The two main parts of M-FOS are Fleet Management Analysis and Drivers Hours Analysis. The hours law analysis covers legal requirements for drivers, restricting the number of hours of driving and ensuring that the required number of rest breaks are taken.

Michell estimates that there are over two million vehicles across Europe producing tachograph charts each day, although Lucas Kienzle aims to sell only a few hundred systems a year.

"The main trouble we have is convincing the smaller fleet operator that he needs a computer," says Michell. "The large operators know what benefits a comprehensive fleet management system can give, but the small operators, and particularly the owner/drivers take the attitude that they have run their businesses by the seat of their pants for so long that they don't need any new-fangled device to do it for them.

"But as you've got to have a tachograph in the cab anyway, it makes sense to make full use of the information it records to help your business."

UK stake in US robot firm

by Kevan Pearson

BRITISH robotics was boosted in two deals last week – one with the US, the other with Japan.

Rediffusion Simulation, the flight simulator manufacturer and Rediffusion subsidiary, has taken a $600,000 stake in US robotics manufacturer American Robot. The deal also gives the UK company exclusive manufacturing and marketing rights for American Robot's new Merlin robot system.

In the Japanese deal, two UK businessmen were appointed to the board of Dainichi Kiko, Japan's third largest maker of industrial robots. Such a move is virtually unprecedented in Anglo-Japanese business co-operation.

The men are John Tomlinson and David Walker, joint managing directors of Dainichi Sykes, the UK importer of Dainichi robots. Dainichi Sykes is wholly British-owned, and a subsidiary of the Yorkshire-based Sykes group of independent oil companies.

The move could lead to an Anglo-Japanese venture to make robots in Europe.

Tomlinson said he and Walker had been co-opted to the Dainichi board to help with the company's worldwide marketing effort.

He added that the move would also cement the relationship between Sykes and Dainichi.

The new Rediffusion deal will result in a subsidiary for the company, Rediffusion Robot Systems, based in Crawley, Sussex. Initially machines will be supplied from American Robot's US factory in Pittsburg, in advance of Rediffusion's own manufacturing programme.

■ **UK falls behind in robots race – See page 6.**

'Cable TV for Paris' row

by Jack Gee

JACQUES CHIRAC, the Gaullist mayor of Paris, has stirred up a political storm by telling the French government it must give priority to laying a fibre optic television cable network for the capital.

Telecom Minister Louis Mexandeau has already announced a national plan for cabling a score of cities with fibre optic at a cost of six billion francs (£600 million) over the next three years. But Paris is not on the government map which covers 1,500,000 homes.

Chirac says 500,000 Paris households must be cabled by 1989 when the Universal Exhibition is held in the capital to mark the bi-centenary of the French Revolution.

Jacques Marette, a Paris city councillor and former Minister for Telecommunications, has drawn up a blueprint to cable 10,000 homes and offices next year with access to six television channels at a cost of Ffr100 million (£10 million).

Then the Paris plan would gather momentum with 130,000 more homes connected between 1985 and 1987 and, in a final stage, a further 360,000 making a total of half-a-million households linked by cable TV.

Clearly pinpointing the political implications of his call for special treatment for Paris, Chirac said, "This will mean the end of State-controlled television as we now experience it in France. It is doomed to die".

Cable TV is now certain to become the subject of a lengthy political debate in France with bitter arguments during the campaign leading up to the municipal elections in March.

First city on the Telecom Ministry's list for cabling is Biarritz where a network covering 1,500 homes will go into service this summer. The Atlantic coast resort has been chosen because the neighbouring Pyrenees put it in a television shadow area.

Then will come Lille, political stronghold of Prime Minister Pierre Mauroy, the city's mayor.

But cabling is likely to be delayed by manufacturing problems. France at present produces 20,000 miles of fibre a year compared with Britain's 35,000 miles.

SALES BRIE

Council bu £235,000 ICL system

ICL has sold a system based o ME29 computer to Harlow Cou cil in Essex for £235,000.

The machine's first task wi to process the Unified Hou Benefits system due to beg April, and will eventually linked up with council micro puters to handle a wide ran smaller problems.

Military contract

US ARMY has lodged a $4.9 lion contract for computer software with Federal Da Systems, which is half owned b Datapoint. The system will used to collect data on patie from US military hospitals o the world, and if all options f future developments are taken, t contract could swell to $65 milli in the next 10 years.

Do-it-yourself

BRITISH Petroleum has awarde Scicon, its systems house su sidiary, a £730,000 contract supply communications process made by the CHI Corporatio The processors replace Univ DCP40s installed two years ag and will link various BP sites.

Kiln control

PLANT at two Kent cement kil will soon be controlled by equi ment supplied by Kent Proce Control for £250,000. The orde includes a Kent P4000 distribut system and will allow the kilns be controlled remotely for produ tion of clinker for cement.

Healthy order

FERRANTI has won orders wo over £250,000 for two laborato data handling systems from th Wessex Regional Healt Authority. The systems will b used for biochemical application

Olivetti scooped

SEVEN-man band Kent Compu ter Consultants has beaten Olive to a big OEM contract from Ple sey. The contract involves installa tion of Plessey System 23 VI with terminals and printers fo time recording and costs of jobs.

CTL hat-trick

COMPUTER Technology has fo lowed its sale of five computers the European Space Agency wi an order for three more of its CTL 8086 systems from two compani involved in development of LSAT, the European communication satellite.

Defence deal

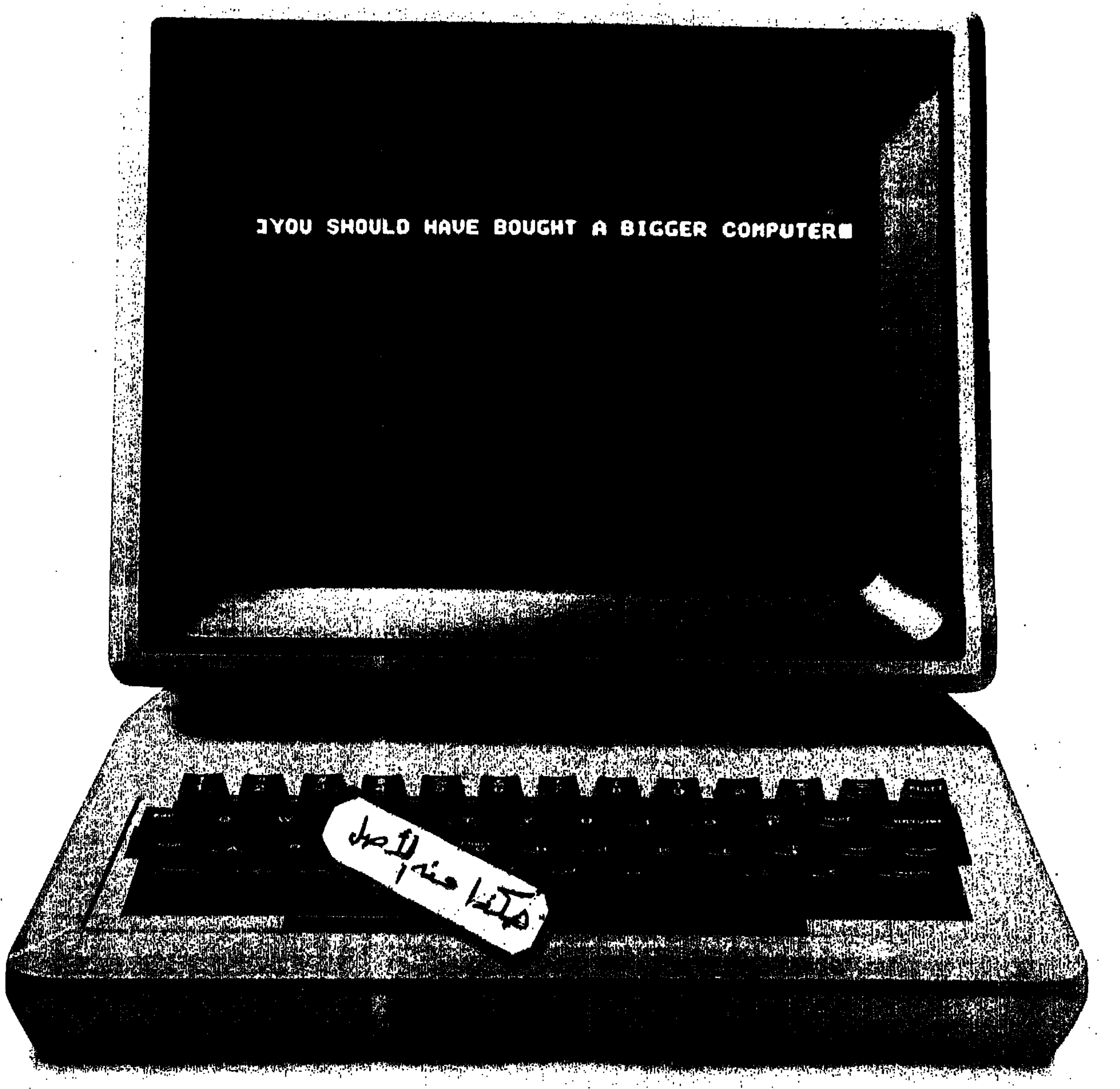
US CHIP maker Inmos has taken clutch of contracts worth $3.8 mi lion from the defence and electro ics specialist Westinghouse. Th contracts involve the IMS140 high performance static RAM fo use in radar of the F-16 fight plane and B-1 bomber.

Effluent monitor

BRITISH Nuclear Fuels ha ordered £250,000 worth of comp ter equipment for remote contr of water effluent at its Sellafie site. Kratos Computer System will supply the control hardwar based on the PDP-11, and sof ware based on its high level la guage Inscribe.

Hazard warning

TREND communications has wo a £70,000 order for printer term nals from the Department o Transport for installation a motorway control offices. Police operators would send hazard warning signals remotely to th terminals, which would set the in structions for display on th electronic overhead displays on th motorways.



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UK falling behind in robot race

BROCK . . . *"Robot itself is only the tip of the iceberg."*

by John Riley

UK INDUSTRY is slow to take up robots. And when it does it takes a piecemeal approach and buys foreign-made machines.

These points were made at the release last week of the robot population figures for Britain and Germany by the British Robot Association, BRA, and the German Institute for Production and Automation, IPA. In comparing the figures, the BRA thinks Britain needs to pull its socks up – and the Department of Inudstry agrees.

Although the UK's robot population rose from 713 in 1981 to 1,152 at the end of December 1982, the German population rose faster, from 2,300 to 3,500 over the same period.

Japan's robot population is now 13,000 and there are 6,250 robots in the US, taking BRA's definition of a robot as being a multi-axis machine with at least four axes.

The degree of robotisation can be calculated by taking the number of robots per 10,000 production workers in each country. Sweden, which has a total population of 1,300 robots, comes top with 17 per 10,000 workers, followed by Japan with 10.7, and then West Germany with 2.6, the US with 2.3, Belgium with 2.1, France with 1.4 and finally the UK with only 0.9.

Tom Brock, secretary of the BRA, pointed out that British companies installed robots in ones and twos compared with German companies which installed them in batches. He warned, "It is foolish to expect accelerated growth for 1983 as the UK automobile industry was the biggest buyer in 1981-2 and has no extensive plans for 1983." But he is hopeful that the 2000 mark will be reached in 1984.

Of the 439 robots installed in Britain in 1982, and valued at about £15 million, 25% were from Japan, and 23% were British-made machines, mostly built by the American-owned company Unimation at Telford.

Dr Rolf Schraft, deputy director of the IPA, said that some 2,000 of the 3,500 German robots were made in Germany.

Both Brock and Schraft emphasised the importance of a systems approach to robotics. "The robot itself is only the tip of the iceberg," said Brock, "and the robot must be integrated into the total manufacturing process."

Integration has been the key to Germany's success, according to Schraft, who stressed the importance of communication at all levels, including the workforce and designers.

At present the commonest single application of robots is spot welding, and other widely used applications include injection moulding, arc welding, surface coating and machine tool servicing. The greatest potential is in assembly, but the problem at present, says Schraft, is that products are designed for manual assembly and a different approach is required when designing for automated assembly.

Chris Jackson, of the Department of Industry's Robot Support Programme, believes Britain can do better and the DoI is intensifying its awareness campaign.

US airlines guide to go online in the home

by Howard Karten

THE US Official Airlines Guide, which lists nearly all scheduled airline flights, is about to go online for consumers.

Beginning on May 1, individuals who pay the $50 subscription fee will be able to use their home computers or terminals to access the database directly.

The information available in the Guide is currently available from a variety of sources – the printed editions (both North American and worldwide), which cost $250 a year; the airlines themselves, most of which maintain free, 24-hour telephone inquiry services; and travel agents.

A spokeswoman acknowledged the free availability of OAG information, but explained that OAG Online is aimed primarily at regular business travellers who wish to exercise greater control over travel schedules.

OAG Inc, the publisher, is a division of Dun and Bradstreet, a major US company heavily involved in publishing and database services.

The electronic form of OAG has been tested for the past year on two consumer information networks in the US, offering free information to consumers. The number of users dropped sharply, when those two services began charging for information.

OAG Online requires an estimated 30,000 users, who will pay both a subscription and a usage fee, to make a profit.

Hardwar under the hammer

by Philip Hunter

COMPUTERS will go und hammer this spring with the major UK auction of secon hardware, in Reading. The is being organised by the Midlands company Charles Auctioneers from the inspira of sister company Oriel Comp of Chipping Norton.

"There is a lot of equip floating about that people ar with getting rid of," says managing director John Li "We are aiming only at equip known to be working," he add

Most of the customers wi dealers looking for spares, Lilley. Hardware on sale will from IBM mainframes to Sin ZX81s – though preferably IBM mainframes, he hopes.

Most of the hardware has c from dealers which have take computers as trade-ins for systems, or from finance ho which have kit dumped on th from liquidated companies.

Equipment has come fro Digital Equipment supplier, Lilley, and an IBM mainfr came from a large company had kept it gathering dust.

The organisers have little ide what the hardware will fetch, as there have been few previous auctions.

Lilley says Oriel once ha batch of Winchester disc dr ready for scrapping – only to someone offer £10,000 for th

Anyone with working hardw is welcome to this first ent Lilley.

Credit card automation to be decided soon

by George Black

A DECISION is expected in the middle of the year on a multi-million pound plan to computerise the UK's credit card system.

Software house Logica has completed a two-month study of the scheme for online checking of credit card payments by customers to retailers. The idea is for automatic deductions to be made from the payer's account.

A four-month consultation period now begins, in which the banks and credit card companies seek the views of retailers and users. The hope is that customers will benefit by not having to carry either a cheque book or cash.

The Committee of London Clearing Banks asked Logica to make a study of the design of the network, which is likely to be one of the biggest and most complicated financial systems in the world.

If there are no hitches, the basis for the network could be laid by 1985 or 1986, with a few thousand terminals connected. This might build up to 100,000 or 150,000 terminals after 10 years, it is hoped.

A Logica spokesman commented: "The sheer volume of transactions is going to be bigger than anything else we have ever looked into."

Successful implementation of the project could also cut out card fraud, bankers believe. The basis for the Electronic Funds Transfer/Point of Sale (EFT/POS) scheme is likely to be British Telecom's packet-switched service, PSS.

The aim is that any card transaction will be verified in a maximum of 15 seconds.

The organisers are keen to convince retailers that the costs involved for them will not be excessive.

Cash offer settles EDP dispute

THE strike at Sheffield software house EDP ended last week after nearly nine months with a cash settlement for 17 strikers and the withdrawal of their industrial tribunal cases.

Neither the union, the Association of Scientific, Technical and Managerial Staff, nor EDP would disclose the figure. Mike Frizelle, local ASTMS officer, says that the sum "leaves the £9,000 or so offered by EDP last November standing."

Richard Jowitt, managing director of EDP, claims that it is not substantially more than the figure on offer two-and-a-half months ago.

One striker who was ineligible to take his case to the tribunal as he had worked at EDP for less than a year when dismissed will, according to Frizelle, receive a share of the other strikers' cash.

COMPUTASTARS

COMPUTASTARS

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UK dates

Birmingham
Saturday April 30
Enfield Sunday June 5
Enfield Sunday June 19
Barnsley Saturday June 25
Birmingham (UK final)
Saturday July 23

Get in quickly for Computastars

by Andrew Thomas

ONLY two weeks to the close of entries for this year's Computastars, and if you don't want to be disappointed, get your form off to the organisers quickly. Places are strictly limited and will be allocated on a first come, first served basis.

Full details of the competition can be found in the February 3 issue of *Computer Weekly*, or can be obtained from the organisers at the address on the entry coupon.

Both men's and women's teams can enter, each comprising between three and five members. The cost is £37.50 per team, with an additional payment of £20 for the teams reaching the UK final, not the European final as wa last week. There will also b charge for the European final. Th amount will be decided when location is finalised.

Alongside the main competi runs the tug-o'-war contest, Co putatug. Teams of six men women can enter this event, long as they are not involved Computastars itself.

Entry cost for this tes strength and determination is

The *Computer Weekly* training schedule continues

■ If you have any queries ab Computastars, don't contact Computer Weekly. The man the answers is Gordon Ca Tel: 01-688 6690.

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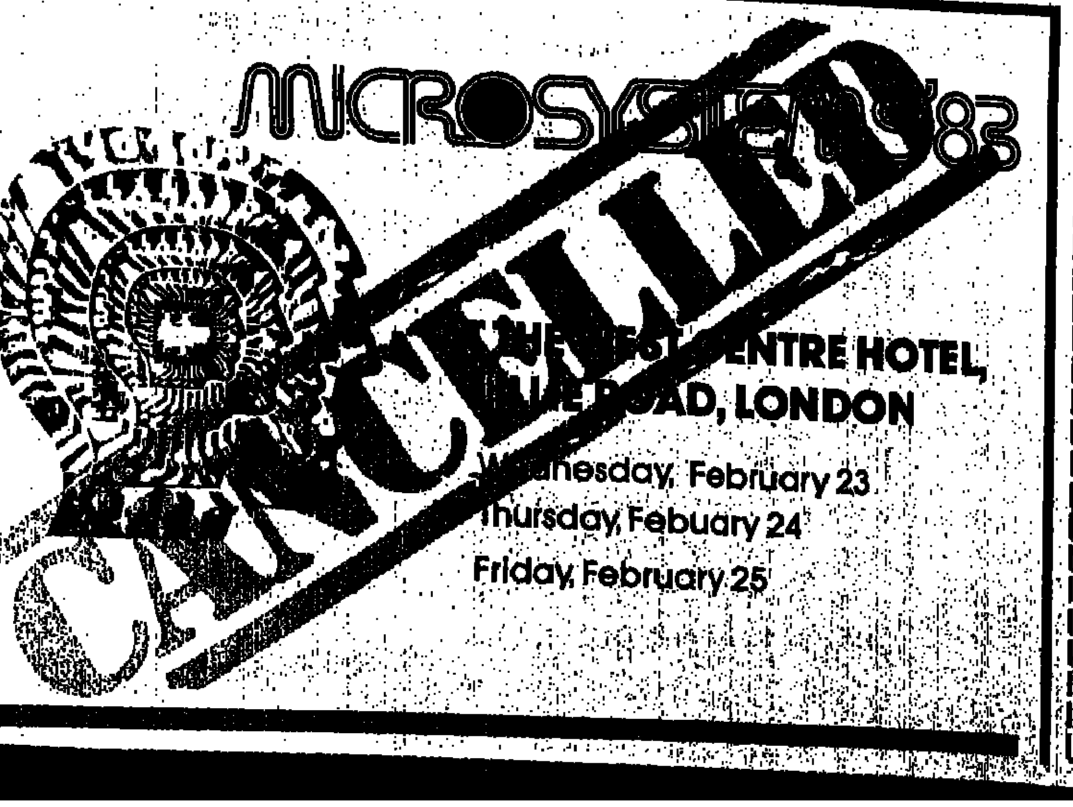

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French telephone exchange tussle

by Jack Gee

FRANCE'S government is in the throes of a bitter argument between the Ministers responsible for industry and telecommunications over vital decisions for the long-term structure of telephone exchange design and manufacture.

At issue is the future of the ITT subsidiary Compagnie Generale de Constructions Telephoniques, which was nationalised last year.

Loss-making CGCT is doomed to be divided between the two State-controlled electronic giants, Thomson-CSF and CIT-Alcatel, a subsidiary of Compagnie Generale d'Electricité.

To streamline the French telephone industry, the Minister for Research and Industry, Jean-Pierre Chevenement, favours the creation of a single firm, Telephones de France, which would design and manufacture existing and future exchanges.

But Louis Mexandeau, Minister for Telecommunications, says French Telecom and foreign telecom authorities must have access to two competing sources of supply.

CIT-Alcatel has a 44% share of the French market, Thomson 40%, and CGCT the remaining 16%. But CGCT makes outdated Pentaconta and Metaconta electro-mechanical exchanges. Thomson's M-20 and market leader CIT-Alcatel's E-10 exchanges are time division all-electronic systems.

So the urgent problem is not merely to decide on the structure of the industry but to find work for CGCT's staff of 7,500 whose exchanges no longer fill the company's order books.

A major challenge comes from the recent alliance between AT&T and Philips to develop and market a new generation of switching systems.

Georges Pebereau, chairman of CIT-Alcatel, said in Paris that his firm would not complain if CGCT was absorbed by Thomson, and he expressed "sang froid" over the AT&T pact with the Dutch multinational.

Pebereau said, "CGCT is not a lame duck. It will need to convert its factories and solve its financial problems. That will take a lot of money and management skill."

Pierre Lestrade, whom the government has appointed chairman of CGCT since the State takeover, says the firm urgently needs one billion francs (£100 million) to avoid bankruptcy and dismissal of its staff.

French Telecom is ready to place an order with CGCT for 200,000 electro-mechanical phone lines, phone sets equipped for detailed subscriber billing.

But Lestrade says orders for obsolescent equipment will not solve the company's long-term problems. "They cannot compete in the marketplace," he added.

Metal giant moves into software

WILLIAMSON . . . Aiming for double during 1983.

by George Black

A £530 MILLION UK heavy industry giant is to move into software.

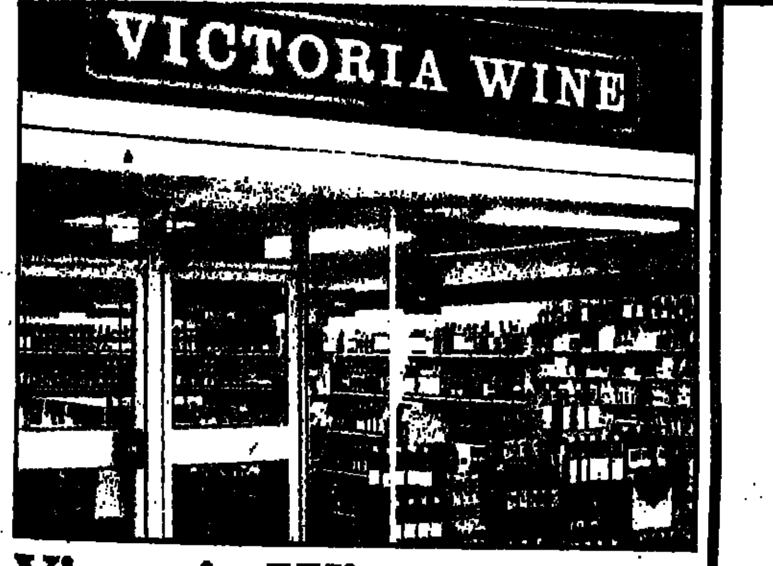
Imperial Metal Industries early this month set up its computer division as an independent computing services company specialising in IBM 8100 machines.

The metals group announced that its in-house computing division was being launched as a service to industry. The 140-strong Birmingham-based division deals in proprietary software, packages and complete systems, based on IBM, Datapoint and Commodore equipment.

The new company starts life with a £3.5 million turnover, of which about £250,000 is earned outside the group. IMI Computing managing director David Williamson said he hoped that figure would be doubled during 1983.

IMI has IBM 3033 and IBM 370 mainframes which handle some 45,000 transactions a day.

Last week IMI was inadvertently referred to as EMI.



Victoria Wine online

by Philip Hunter

ONE of the world's largest retail shop communications networks is being installed by the Victoria Wine chain to bring its 920 shops online. The £5 million system linking shop tills with a central IBM computer is a joint venture between Centre-file, the computer services subsidiary of National Westminster Bank, and Thorn EMI Micrologic.

Thorn EMI eventually will supply 1,500 point-of-sale terminals with keyboards for entering each sale, deductions being made from stock levels stored on attached floppy discs. Each night the system will take advantage of British Telecom's prepaid midnight line, costing £200 a year, to send the day's sales data to Centre-file's IBM 3033 mainframe in London.

Centre-file will process the information once a week, and send trading details on a magnetic tape once a month to Victoria Wine's central offices in Cheshire.

The system, code-named Vicky, enables individual stores to watch stock levels closely for astute reordering.

"And now we can identify what products are being shoplifted," says Victoria Wine managing director Eric Colwell.

A likely future development will be to link the network to computers of the liquor suppliers for automatic reordering. Meanwhile both Centre-file and Thorn EMI say that similar systems are in the offing for other non-food retail chains.

"We have a new commitment to point-of-sale," says Thorn EMI general manager Colin Bates.

The cost of teleprocessing software was cited by all three parties for the choice of IBM central hardware.

Varsity £100,000 sales

by John Riley

SALFORD University has pulled in more than £100,000 in just over six months from sales of its own software.

The university-developed Fortran 77 compiler for Prime machines has notched up 50 sales since it was launched commercially last June.

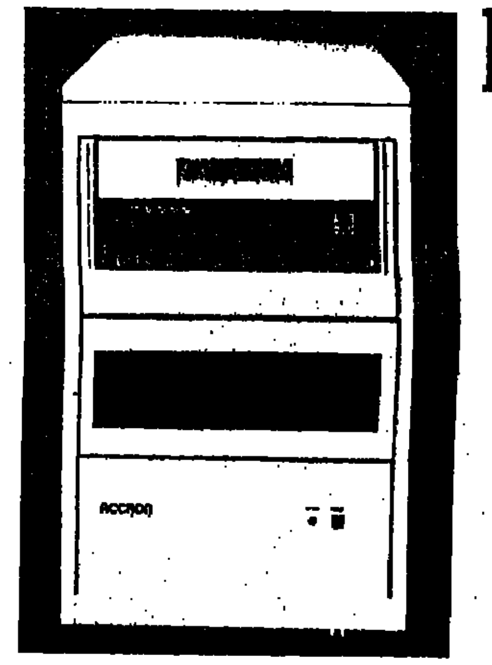
The compiler was developed by three members of the computing services staff, Dave Valence, David Bailey and Nigel Ross, originally for in-house use. But as the version they came up with is, according to Valence, five times faster, more compact and has better diagnostic capabilities than Prime's, they decided to market it.

Since June 1982 there have been 25 sales in this country and a further 25 abroad, including the US, Australia, New Zealand and Sweden, and the team is now trying to penetrate Europe.

The team has a "good relationship with Prime," said Valence, who pointed out that Prime benefited by spin-off demand for its hardware.

"This goes a long way to showing that we are not just an ivory tower, and that we can produce competitive software for use in commerce and education," he said.

The cash is going towards improving facilities within the University Computing Service which was hit by government cutbacks last year.



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NEWTONS Laboratories has been trading (profitably) for more than 7 years. We supply copies of our accounts on request. The computer division specialises in multi-user micro systems, developed and supported by UK based professionals. Its customers include British Telecom, the DHSS, Local Councils, small businesses and large businesses such as BTR and Plessey. NEWTONS Laboratories is involved in continuous research and development.

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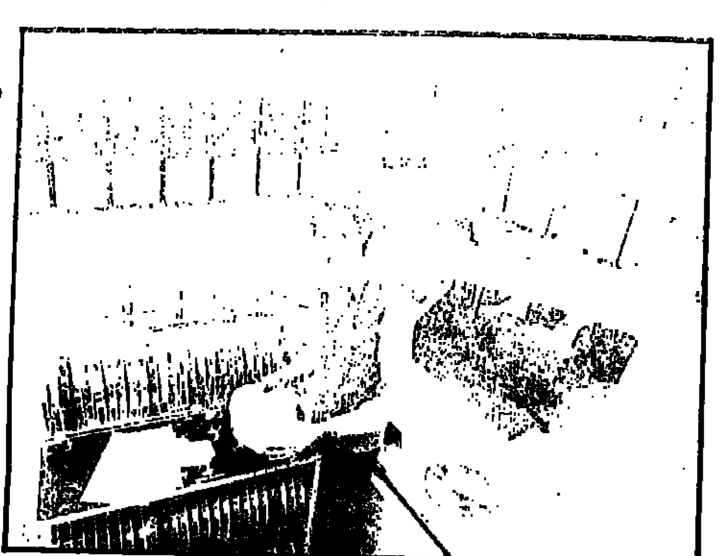
Trade restrictions make half the US market inaccessible to foreign firms, says Kevin Cahill

Land of the free – for everything except trade



Computer room at the Driver and Vehicle Licensing Centre in Swansea. Will IBM rue the day it won the order?

ANY UK manufacturer hoping to achieve real market growth similar to companies like Apple must go to the US. Unless the company is very small and supplies relatively insignificant products solely to the end user market, it will find in the US market some of the most severe restrictions on free trade imposed anywhere in the world.

Centrepiece of the trade restrictions imposed by the land of free enterprise is the Buy American Act of 1933. This Act was brought in partly to meet a Buy British campaign running in the UK at the time, and partly to offset the effects of the recession. It effectively prevents foreign companies – particularly British ones – from offering their goods to the federal agencies whose purchasing power constitutes about half the US market.

The Buy American Act now operates in conjunction with the General Agreement on Trade and Tariffs jointly signed in 1981 after much harrowing negotiation by the US and many other countries, including the UK and Japan.

The declared object of the GATT agreement was to eliminate trade barriers between countries.

In fact, GATT represented a diplomatic failure for the UK and a triumph for American protectionism.

The US wrote in a series of exclusions, covering almost all the federal agencies originally covered by the 1933 legislation.

One of the exclusions is the US Department of Transport and this led Sir Christophor Laidlaw, ICL chairman, to remark at the recent annual meeting that in the US ICL would have been specifically excluded from winning contracts similar to one from the Driver and Vehicle Licensing Centre at Swansea.

Sir Christophor's remarks were particularly bitter because ICL was excluded from this prestige contract essentially because the UK's purchasing agency, the CCTA, refused to change the timetable for tendering by a few months – something unheard of in the US. And IBM in its barely disguised role as a sovereign power, actually threatened the UK government with the GATT rules.

Many UK commentators feel that IBM may live to rue the day, both at Swansea and elsewhere.

By handing the Swansea contract to the Americans, the UK government has quite specifically opened up a public sector contract which would not be available to British firms in the US.

The very presence of IBM on the site gives UK authorities an ideal case to present to the US in further GATT negotiations. Additionally, the government may have felt, as many in the industry do, that Swansea is a can of worms which might well devour the still emerging credibility of the convalescent ICL, whose last passage through Swansea did little for the company's credibility.

But GATT is only the tip of the iceberg when it comes to the various ways the US acts to curb the sale of goods, particularly computers and electronic devices, manufactured by its allies. Attached to the US Embassy in Paris is an obscure and secretive multinational body called Cocom.

The object of this organisation is to monitor and control the transfer of technology from members of the Western alliance, including non-NATO members Norway and Japan, to the Communist bloc, including China and Cuba.

The Cocom secretariat is manned by a single full-time official, who never answers the telephone and who never speaks to the Press, and a part-time secretary on loan from the American Embassy next door.

Cocom operates according to a series of lists of prohibited goods, and a series of reviews of selected neutral equipment. The most recent victims of Cocom delaying tactics were the two Japanese computer giants, Hitachi and Fujitsu.

Both companies received orders from China for medium-size mainframes in 1980, for use in Beijing government departments. The technology in both cases was mature, the machines were mid-range, and contained nothing sensitive.

Yet neither machine was approved for delivery until early 1982.

In the meantime, both Japanese companies lost valuable marketing momentum, and a series of US rivals, including Burroughs and Data General, took orders and delivered essentially similar machines.

But the Japanese are not the only victims of Cocom's favour-the-US policy.

> **By handing the Swansea contract to the Americans, the UK government has quite specifically opened up a public sector contract which would not be available to British firms in the US**

Early in 1981, a major UK electronics company received a vital order from Poland for a plant producing semiconductors. The devices involved were transistors, again a mature and non-sensitive product, with a big jobs pay off in the UK.

Cocom turned down the application for the plant and the UK company, and the UK government had to stand by and watch the order go to a US company operating from France.

With the UK itself in the grip of a severe recession and every available job at a premium, the UK is finding it hard to swallow decisions made by the US Commerce Department and by Cocom.

The UK government, in private if not in public, is also well aware of the observation made by a recent venture capital company director. He showed that a US government study had found that the top 1,000 companies in the US had, overall, made a net nil contribution to increased employment in the US over the past 20 years.

Jobs created by the US multinationals in the UK, valuable though they are, are but a fraction of the jobs which would be created by small local companies.

Not only is the UK market dominated by US companies; but US companies have opportunities in the UK which are not open to UK companies in the US.

The UK Department of Transport has chosen IBM at Swansea. The Department of Energy uses IBM and DEC equipment in many of its sites, including BNOC prior to privatisation.

The UK Post Office, including British Telecom, is a widespread user of US-made equipment, including IBM, DEC and Wang.

Yet the three equivalent bodies in the US are specifically excluded from open tender in the US.

This severely limits the market available to UK companies, and places huge constraints on growth potential for small companies, particularly start-ups.

In the US itself, the current conservatism in both government and public opinion has led to near paranoid reactions over the supply of technology to the Eastern bloc.

This paranoia has in turn been used, some would say abused, by the US government in ways that affect UK companies trading in the UK, Europe and Eastern Europe. Last autumn, the US Assistant Secretary of Defence, Richard Perle, visited the UK and briefed the top men in the UK electronics industry on the nature of Soviet technology acquisition policy and the threat it posed to the West.

He was politely received, not least because many UK electronic companies are already vendors in a small way to the US military, and hope to increase their sales.

Arguing with the Assistant Secretary of Defence is not the way to influence people and win customers, as one of those who met Perle puts it.

Perle said Soviet acquisitions of Western technology were saving Russia millions in R&D each year, costing the West millions in counter measures and were increasing the military capability of the Soviets.

He produced dramatic slides of alleged Soviet sonar buoys which used well-known Western chips, said to be from Texas Instruments, to drive the electronics.

At least one senior UK manager was downright sceptical about the evidence Perle produced: "Sonar markers for submarines are constantly being picked up by both Soviet and US submarines," he said.

This source also suggested some reluctance on the part of Perle – who was described as something of a missionary – actually to produce the sonar buoy.

Perle suggested to the UK bosses that unless the drain to the Soviets was stopped, the US would cease to issue licences for export of key technology to its allies.

The first victim of the new attitude was France, recently denied export licences for two Cray machines from the US.

In California about six top US electronics executives have been shown a draft proposal which outlines the measures the US is considering. One of the executives said that if the list was ever implemented, his company would lose half its overseas business straight away.

But because of Cocom, the US can exercise control over exports of companies such as ICL which have long-standing and completely legitimate business in Russia.

UK trade officials are currently non-committal about this state of affairs, although some are suggesting that only the delicacy of the situation has prevented a public explosion.

The Prime Minister is known to be worried about what she has been told by people like Sir Christophor Laidlaw – and Thatcher is not a woman to allow matters to slide for long periods.

Action of a positive and public nature can be expected soon, according to reports from the Commons.

What the Buy American Act means

THE Buy American Act of i- gives a competitive advantage bidders offering US-produced goods to US government departments and agencies procuring materials for public use. It was enacted to combat the depression and a "Buy British" policy which was then in effect in the UK.

The Act and regulations made under it are complex but the key elements are:

(a) The Act requires that Federal agencies only procure "domestic end products." To qualify as a "domestic end product," a manufactured item must be manufactured in the US, and more than 50% of its components (measured by their cost) must have been manufactured in the US.

(b) There are, however, four exceptions to the rule that the government must procure domestic end products for its own use. In these cases the government may procure similar foreign materials. The exceptions are:

If the cost of domestic end products is unreasonable; if the procurement agency head determines that it is inconsistent with the public interest to procure domestic end products; if domestic end products are not reasonably available in sufficient commercial quantities and of satisfactory quality; and if the end product is for use outside the US.

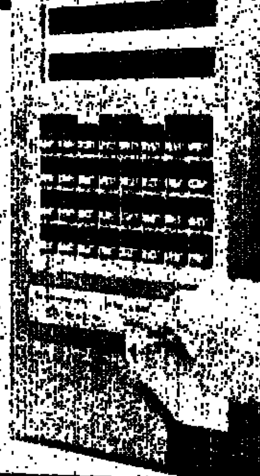
On January 1 1981 the US government, with the EEC, Japan and other developed and developing countries, implemented the GATT Agreement on Government Procurement. The purpose of the Agreement is to open up the procurement of specified government agencies in each signatory State to free and open competition from suppliers in those States. Procurement requirements are to be published and tendering requirements and procedures are to be such as to not give preference to domestic products and suppliers. The requirements of non-discriminatory competitive tendering do not apply where the products required are only available from a single supplier; where there is extreme urgency over the procurement requirement; where reasons of compatibility and interchangeability make a change of supplier inappropriate; where the products are required for research, development or experiment; where the price of the goods concerned is less than $190,000; and where the procurement is for defence and national security purposes.

The scope of the GATT Agreement is further limited as follows:

(a) It applies only to specified central government agencies and not therefore to State or local procurement. This is the case even if such procurement is financed by federal loans or subsidies. (The EEC directive, which applies within the Community does, however, apply to local government procurement.)

(b) The specified central US government agencies do not include The Department of Transportation (parts of the Department of Transport are included in the UK), the US Postal Service (the postal business of the UK Post Office is included), the Department of Energy (the UK Department of Energy is included), the Army Corps of Engineers, and the Tennessee Valley Authority.

(c) The GATT Agreement does not apply to US government construction contracts, service contracts, purchases of items for resale, lease or rental agreements, small or minority business set asides.



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Apollo into new domain with low-end 32-bit unit

HIGH performance micro manufacturer Apollo Computer is moving into application areas with additions to its Domain networking micros. The high performance Domain workstations, based around the Motorola 68000 family of 16/32-bit chips, have been joined by a lower-cost machine, coming in at below £10,000 but giving 32-bit virtual memory mainframe power.

Along with this unit, called the DN300, comes an intelligent controller to handle peripherals and communications around the Domain network, DSP80, and an X.25 communications gateway which opens up communications between Domain networks and remote computer systems.

And there is more to come soon, at the high end of the range.

The price of the original system, at more than double that of the DN300, meant that Apollo was really only looking at the high CAD and modelling market.

With the new unit it can start turning towards production engineering applications, text preparation for typesetting, and even standalone business graphics.

"We want computers in the office space, along with the engineers and scientists," says Apollo president Bill Poduska, "though we'd just as soon have things like the line printers removed from the office.

"We put high performance mainframe capability on a desktop, and integrate it into a network, so you have machines dedicated to individuals rather than people scurrying around a shared mainframe."

Apollo's spread downwards in price depends very much on keeping up with technology. It claims to be the first company to have a production system using the 68010 processor from Motorola. Coupled with a memory management unit this gives a virtual address space of 16 Mbytes to each of 15 concurrent user processes.

Experience with the 68010 – which does what the 68000 always should have done, says Apollo – leaves it well placed to take advantage of forthcoming Motorola technology like the 68020 processor.

The basic DN300 comes with half a megabyte of main memory, expandable to 1.5 Mbytes, and a bit mapped high resolution screen. It costs £9,250 in this basic form. A 34 Mbyte Winchester and a floppy disc drive can be added for about £10,000.

The operating system used is Apollo's Aegis, common to all the Domain processors, and an implementation of Unix System III, called AUX, will be added soon. Communications with other computer systems include 3270 and Hasp, as well as the X.25 and Ethernet capabilities.

Most application software still centres around CAD uses such as finite element analysis, but Apollo is moving towards office-type applications as add-ons to these.

UK managing director David Howes still sees his market being this engineering/scientific application, though the systems houses which make up 35% of the UK buyers of Domain machines may well see it differently.

The screen management system allows users to overlay views on the screen, with one window per process, and the cursor can be moved around the screen using a touchpad, echoing features in Apple's new Lisa machine which is aimed firmly at commercial applications.

But for the moment the competition is in the scientific market, and comes mainly from the traditional time-sharing suppliers IBM, DEC and Prime.

PODUSKA . . . *"High performance mainframe capability on a desk top."*

Micro News is compiled by Robert Parry

Intel redoubles efforts in high performance processor market

INTEL is keeping up the pressure in the high performance microprocessor stakes. It has come out with an evaluation kit for its iAPX 286 processor, and announced a clutch of memory boards and systems software for the 286 to be available from the summer.

The evaluation kit sells for £7,800 in the UK and is based around the iSBC 286/10 processor board, available now in engineering samples and scheduled for July in production volumes. The 286 chip itself should be in volume production in March or April.

The new memory boards, the CX series, have been brought in with a new bus grafted on to the general Multibus architecture. This iLBX, for local bus extension, allows off-board memory to appear as though it was located on the processor board.

Four boards can be connected to the processor through the iLBX bus, with memory transfers taking place at the same speed as from the onboard memory.

The maximum memory that can be added in this way is 16 Mbytes, the physical address space of the 286 processor, though the practical limit at the moment is two Mbytes, set by the memory carrying capacity of the CX boards. The memory boards are dual ported, allowing data transfer to Multibus as well as iLBX.

The iLBX bus is also to be connected through an interface board to Intel's high speed I/O path Multichannel. Through this interface, iSBC 580, large block transfer of data between I/O devices and system memory can take place along the high speed iLBX, and then be moved around the system via Multibus.

"Multibus is now becoming very much a systems control bus," says Intel's OEM operation general manager Tom Kinhan.

"The SBX Bus gives on-board I/O expansion, taking away I/O peaks; Multichannel gives the high speed I/O capability; and now the LBX takes away the memory access peak, moving memory contents quickly to a particular processor."

With the new 286/10 board, which will cost about £2,500 in single units when in production in July, users will be able to upgrade system speed by replacing current 8086-based boards in Multibus systems. This should give a performance increase of about a factor of three, says Kinhan.

The operating system for the 286, iRMX 286, is now available in the reduced form – limited to the real address mode – so applications written under iRMX 86 can be moved straight across to the 286/10 board.

The full virtual address mode operating system, iRMX 286V, is scheduled for the summer, and an implementation of the seemingly omnipresent Unix operating system, in its Xenix incarnation, is under way.

Japanese semi firms fear links with US

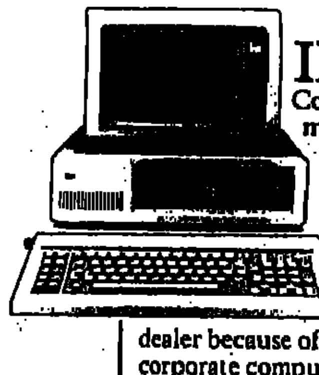
THE feud between American and Japanese semiconductor producers lives on. The prospect of increasing exchange of information between US and Japanese enterprises in the military field, which has arisen out of Japanese Prime Minister Yasuhiro Nakasone's recent visit to the US, has led to fears in Japan that the plea for closer links on military technology is a way of getting at the general purpose high technologies.

At the same time that US companies involved in military work are trying to gain access to Japanese technology, semiconductor companies are pushing the US government to intensify efforts to open up the Japanese market for their products.

"We are asking the government to continue negotiations directly to reach accord on opening up the Japanese market," says Warren Davis, director of government affairs at the US Semiconductor Industry Association.

"The market is *de facto* closed, except for the very newest chips – which they let in until a Japanese company can copy it – which makes it difficult for US companies to sell or invest in Japan."

Davis says the SIA is looking for free trade between the two countries, and is strongly backing a reciprocal trade pact that would allow the US government to insist on fair trading.



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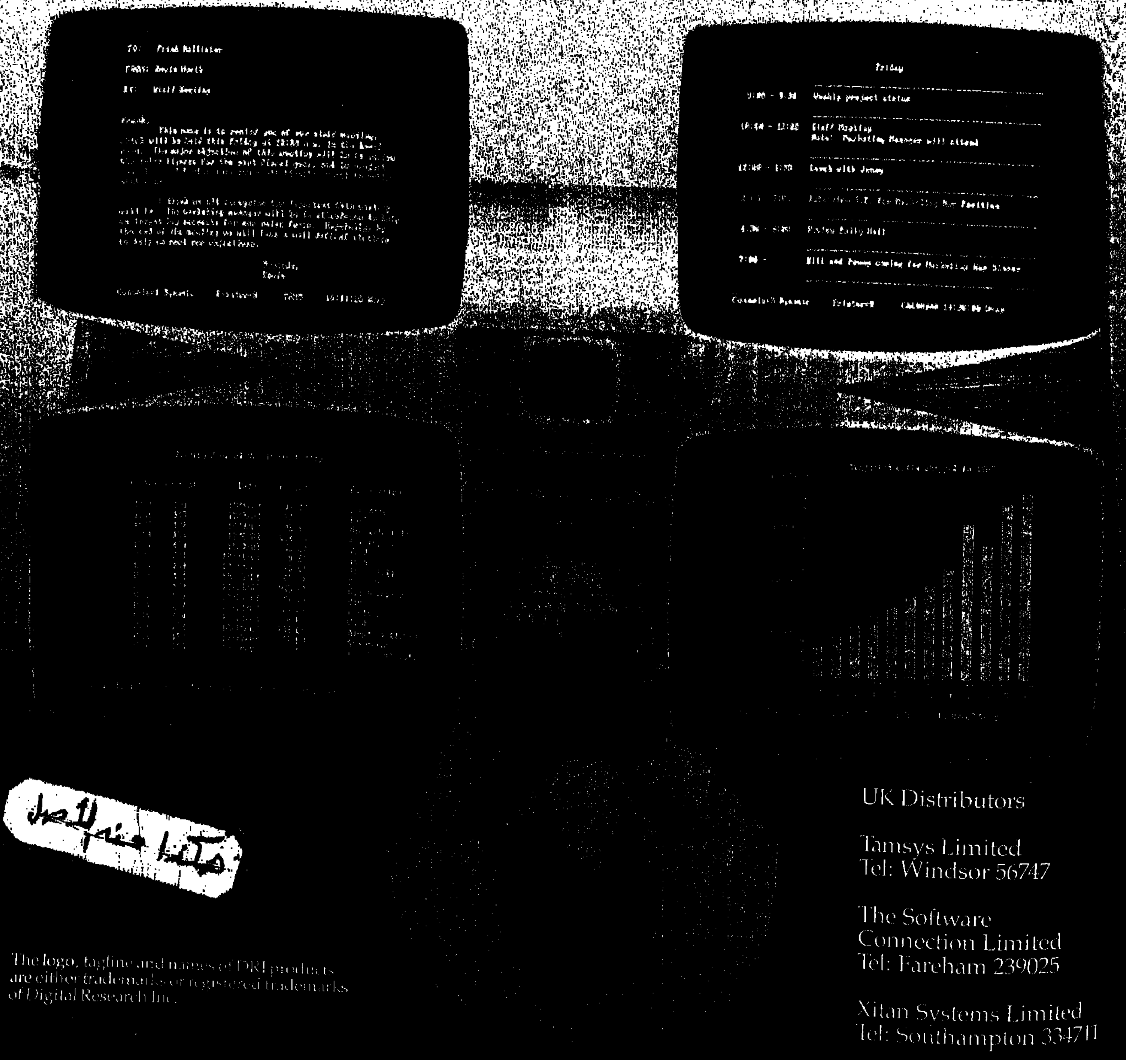

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SDS 'best solution available'

by George Black

SOFTWARE Sciences' SDS tool is "the best solution available in the UK today for a software development database", according to a government-commissioned report.

The report, by BP's software subsidiary Scicon, is the first in a series for the Department of Industry which is seeking to pool the latest knowledge on the value of such tools. Scicon uses SDS under a Ministry of Defence contract.

The user says that a lot of training is involved in the use of SDS. Its progress has been difficult and is still not complete, says Scicon, but there is praise for its flexibility and robustness.

The DoI is co-ordinating a public sector drive to harmonise software tools and methodologies for large, real time systems. Participants will be the Ministry of Defence, the Civil Aviation Authority, British Gas, British Steel, British Telecom, the Central Electricity Generating Board, the South of Scotland Electricity Board, Ferranti and Pactel.

The decision to mount the harmonisation drive stems from recommendations in last year's report by the National Economic Development Council. The Council lamented the present "fragmentation of effort" by British software methods R&D bodies, both public and private.

The co-ordinated approach of Toshiba was contrasted with the disarray of most UK software producers. A notable exception quoted was British Telecom's System X project. The NEDC said British bespoke software rightly had a high reputation, but more standard packages were needed as development costs soared and greater efficiency must be achieved.

The inquiry is to look first at non-language-specific tools, but will not cover Ada, Apse or any of the Alvey committee's proposals.

Meanwhile the American Defence Department is to spend an extra $227 million over the next six years above its estimated $600-700 million budget for the period on software tools development. This is calculated to generate a sixfold increase in the quantity of programs created. The US Defence Department has current software costs of $5-6 billion a year, expected to rise to $32 billion a year by 1990.

The boost to the American investment is intended to fend off the challenge from Britain, France and Japan.

LOWREY . . . "Our machines can do things the PC can't."

Software support sought for advanced terminal

CONVERGENT Technologies' advanced Turbo workstations are to get a further push into the booming micro market and the company is looking for software houses to help it. Sole UK distributor Computer Technology Ltd (CTL of Hemel Hempstead), is mounting a two-pronged attack, which is expected to bring the announcement of some big contracts soon.

One prong is through direct sales to top companies and government bodies; the other is through software packages for the "vertical", trade-specific markets.

A team of 12 is working to get the new Turbo workstations into some of the country's biggest firms.

"The arrival of IBM's Personal Computer has done us a lot of good," says Turbo product manager Gary Lowrey. "It has shown that our high performance machines can do things that the PC can't. IBM users can link up to it quickly and have all the advantages of distributed processing."

IBM, ICL and Honeywell mainframe users are seen as CTL's growth area. Burroughs users already get the workstation under Burroughs' own B20 label. The machine also appears in France under Thomson-CSF and in the US under NCR labels.

CTL is teaming up with software houses such as AE Data Services to provide packages for individual trades. ADS, a subsidiary of Electrolube computer cleaning products, has just moved its Books package on to the Turbo.

ADS marketing director Chris King said they had already sold it on the Series 8000 machine to publishers George Allen & Unwin, mapmakers Bartholomews and to the Aberdeen University library.

CTL is not alone in exploring the field. Technologic of Wrexham, which buys CTL's Turbos, has sold some £300,000 worth of systems to brewers Greenall Whitley and is seeking expansion into the drinks business.

'Don't believe everything a computer tells you'

by Andrew Thomas

PEOPLE are too gullible when it comes to computers, according to a new report* from the US. International Resource Development claims, in a 265-page survey, that sophisticated software produces such impressive output that it is accepted as gospel even if the figures are rubbish.

IRD project director Stephen Caswell summed it up: "Because the output looks official, it becomes hard not to believe it."

I can vouch for the accuracy of Caswell's observation. During my time at ICL, it befell me to prepare statistics on machine availability, performance and so on. These figures were prepared from handwritten logs, prepared by the operators, the arithmetic being handled by a pocket calculator.

The results were typed up and given to the boss who would use them as ammunition in his weekly review meetings. After a while I decided that the figures would look better if they were produced by one of the computers, so I set up a file which I would edit each week, then list off the required number of copies.

At the next review meeting, the boss was berating the DP manager for failing to achieve the target 97% uptime. The DPM argued that he had, in fact, managed 98% that week, and had figures to prove it.

"Don't argue with me, my figures are produced by the machine, they can't be wrong," replied the boss.

I sat quietly, keeping a straight face and toying with my calculator.

*Non-Vertical Business Markets For Microcomputers And Software, International Resource Development, 30 High Street, Norwalk, CT 06851 USA. Phone 800-243-5008. Price $985.

Accounts package for UK

By George Black

McCORMACK & Dodge's accounts payable system A/P Plus has been brought to Britain by the Rio Tinto Zinc subsidiary RTZ Computing Services.

A/P Plus, with 700 users worldwide, has been taken on by six UK organisations, including Sainsbury's, Nestlé's and a local authority.

Bristol-based RTZ has anglicised the package for use on IBM machines and plans to release an ICL version in June. McCormack & Dodge, a major rival to Management Science America in the financial software field in the US, has been working through RTZ to try to penetrate the European market since 1978.

M&D's G/L Plus general ledger system, which now has 1,000 users, was adapted by RTZ for use in this country in 1979 and has also been prepared for ICL users. G/L Plus also has Honeywell and Univac versions.

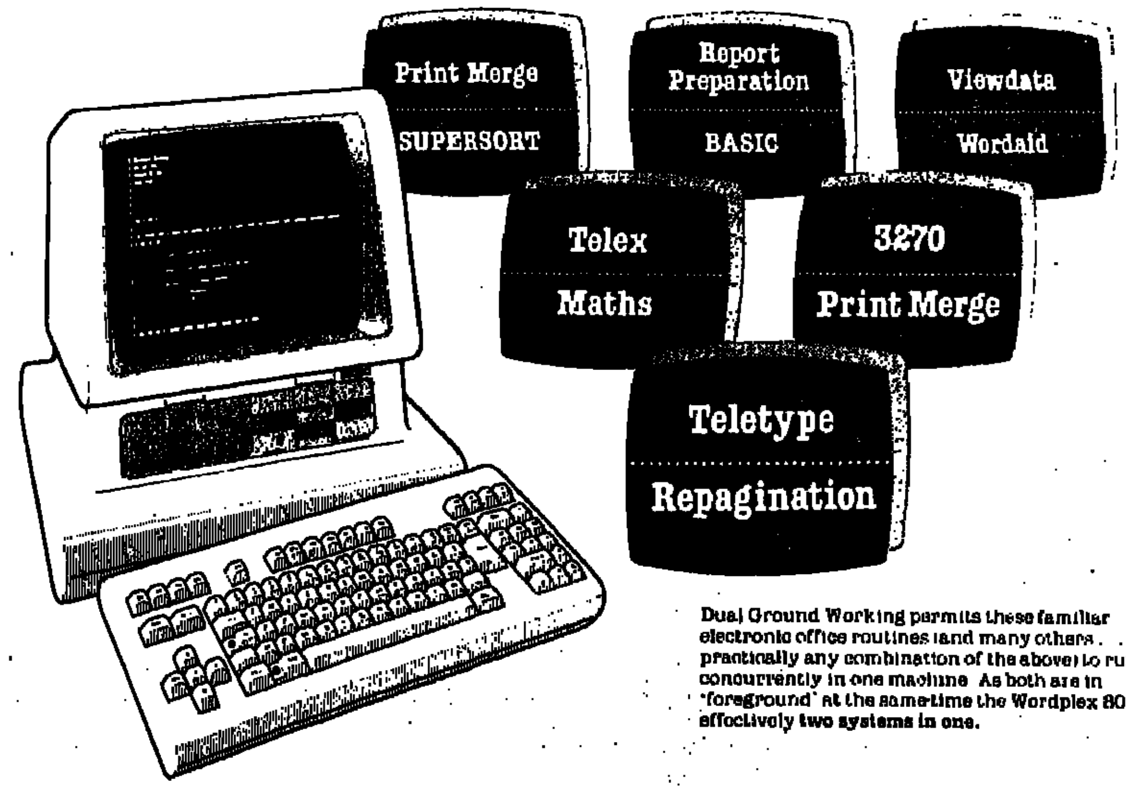
Now RTZ is working on conversion of the M&D purchase order system P/O Plus for issue next January in an IBM version and later for ICL machinery.

"Most British companies can't tell what their expenses are going to be in three months' time," said product manager Roger Barnes. "American managers have shown themselves far less conservative and more willing to computerise. But next year the attitude here will have changed. Managers are going to want to know exactly what their commitments will be."

Purchase order systems had been the cinderella of accounting, he said. Many firms wasted money in this way – for instance, by not promptly reclaiming overpaid VAT.

RTZ, which has been growing at 40% per year, now has about 100 staff, half of whom are engaged on the software operation.

The Wordplex 80-4 with Dual Ground Working



Dual Ground Working permits these familiar electronic office routines (and many others . . . and practically any combination of the above) to run concurrently in one machine. As both are in 'foreground' at the same time the Wordplex 80-4 is effectively two systems in one.

the first word processor based multi-function office system

Because of the unique, Wordplex-developed Gemini operating system's ability to provide Dual Ground Working the Wordplex 80-4 has the power of two systems in one.

The 80-4 has the additional benefit of Winchester disk storage — 10 MB capacity sealed disk unit — while transferable storage facilities are provided by a 500 KB floppy diskette.

The system is completed with the 45 cps top-quality Echo character printer.

Wordplex provide a complete range of compatible and modular office systems. For example, additional applications software or workstations may be added to the 80-4. If even greater storage and processing power is required, the 80-4 system can be integrated with Wordplex shared-resource systems.

Development from one system to another is so smooth and logical that operators require instruction only on the additional facilities, resulting in much greater efficiency.

WORDPLEX
word processors
office systems

Please send me more information on the Wordplex 80-4 with Dual Ground Working

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(Please return this coupon to: Richard Kemp, General Manager, Wordplex Ltd, FREEPOST, No stamp required, Reading RG1 1RR. Telephone 0734 585248 Telex 848580.

UK computer industry link-up to top US funds

THE UK will shortly have access to some of the most influential computer industry venture capital funds in the US via an Irish finance company.

Inishtech, based in Dublin, will be listing its shares on the Dublin Stock Exchange later this week. This will give UK investors access to Inishtech stock, which will automatically be available on the UK Stock Exchange.

The fund has direct links with two of the most important sources of venture capital for computer companies in America: Boston-based Burr, Egan and Deleage, and Schooner Capital Corporation.

Frank Kenny, managing director of Inishtech, says the form of investment known as venture capital has virtually floated the US computer industry into existence.

In the Bay area of San Francisco, venture capital companies in partnership with the computer and high technology industry are credited with creating over 1,000,000 jobs in the past 20 years, says Kenny.

From an Irish standpoint Inishtech is an "offshore" fund because the Republic now has extensive exchange control regulations.

The UK has no such restraints, and British investors are free to invest in Inishtech via the London Stock Exchange.

A significant number of UK investment institutions, impressed by the fund's US connections, have already requested prospectuses and look set to follow the Irish institutions which have put up the first £2 million.

Kenny is careful to point out that while the thrust of the fund is in the direction of investment in the US, there is no bar on suitable UK companies approaching Inishtech.

He notes that if the UK interest materialises in the form of shareholdings in the fund, he and his partners would look more specifically at the UK in placing investments.

One of the important points made by Kenny is a direct refutation of company failure figures produced by the banks and financial institutions in the UK.

He cites a recent study in the US which showed that the failure rate for venture capital funded companies was four out of 10, and not the four out of five figure often seen in the UK.

Of the 100 companies surveyed for the report mentioned by Kenny, only 15 were outright failures. The next 25 showed a partial loss, often remedied by merger or sale. The following 29 showed anything from breakdown to a return of twice the sum invested.

Moving into the last 30% of companies, 20 showed a return of two to five times the investment made in the company and eight companies made a return on investment of five to ten times.

The overall rate of return on all venture capital funds in the US over the past ten years has been about 27%.

Kenny's partners in the Inishtech venture, Burr, Egan and Deleage, have out-performed the other funds substantially, turning in 40% return on investors' funds over the decade.

Noticeably, BE&D have been significant investors in computer companies (see figure 1).

The star performer in the pack was obviously Tandon, and Inishtech provides a detailed guide on the way the company was funded (see figure 2).

Kenny notes that in a typical venture capital situation, failure comes early; success takes time to mature.

KENNY . . . *"Failure comes early; success takes time."*

Investment successes

BURR, Egan and Deleage's most notable computer company successes include:

Company	Funds Invested	Investment Value
Data 100	$333,000	$960,000
Datel	$100,000	$1,068,000
Dysan	$440,000	$2,112,000
First Data	$88,000	$1,806,000
Printronics	$200,000	$4,157,000
Tandem Computers	$100,000	$1,738,000
Tandon Corporation	$1,750,000	$78,956,000
Triad Systems	$2,082,000	$16,192,000
Vector Graphic	$515,000	$9,980,000

Figure 1.

How Tandon was funded

*Started in February 1976: Management Ex-Pertec.
*Product: Disc drives for microcomputers.
*Seed funding: $20,000 by management and $300,000 by adviser to Inishtech. Inishtech adviser invested in later rounds, $1,050,000 in 1978, $400,000 in 1979.

	1976	1977	1978	1979	1980
Sales (m)	$0.18	$1.4	$3.2	$6.6	$22.7
Income	$0.020	$0.089	$0.163	$0.161	$1.507
	$0.01	$0.03	$0.04	$0.02	$0.21

*Inishtech adviser invested $1.75 million. Realised $7.16 million in 1981 on sale of part of holding. Value of balance $71.8 million. Return of 45 times funds invested.

Figure 2.

North Yorkshire - High Techknowledgability

Fast growing 'high tech' industries need room to grow with good communications, a growing and flexible workforce, low operating costs and a superb environment to which scarce, highly skilled staff are attracted. In fact, a place just like North Yorkshire.

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The Industrial Development Department,
North Yorkshire County Council,
County Hall, Northallerton,
North Yorkshire DL7 8AD . . .
and we will send you further information

•HARROGATE•MALTON
•NORTHALLERTON•RICHMOND
•RIPON•SCARBOROUGH•SELBY
•SKIPTON•THIRSK•WHITBY•YORK
and surrounding countryside.

North Yorkshire
ROOM TO GROW

End of govt backing for BTG?

LOST in the depths of the government's expenditure forecasts this year is the death sentence on the old National Enterprise Board. The British Technology Group, the successor to both the National Enterprise Board and the National Research and Development Corporation, is to receive £10 million to maintain its existing commitments and to fund new ones in the coming year.

This compares with over £60 million invested in 1981 and an average of over £23 million a year for most of the past decade.

No figure has been mentioned for succeeding years, but last October senior BTG officials were warned that they should prepare plans to include provision for operations based entirely on internally generated funds.

The lack of open comment from the Department of Industry, and widespread rumours in the Commons, point to this year as the last in which any government funding will reach the BTG.

But the BTG, which might expect to become a small venture capital fund based on the sale of its existing investments, is under siege from the Treasury, which wants to take back up to two-thirds of the proceeds of any sale of investments.

Sir Frederick Wood said, somewhat optimistically, when he took over as chairman of the BTG, that he hoped the government would see the NEB off with a £100 to £200 million "dowry".

In practice, as *Computer Weekly* noted at the time, Sir Frederick looked suspiciously like the kind of chairman who would implement rather than oppose government policy.

What will be left of the NRDC and NEB operation by the end of the year, stripped of its automatic right to patents of inventions from government establishments, is hard to predict.

Certainly the government has left itself without a clear method of handling national high technology enterprises when they become commercial casualties, as Ferranti and ICL once did.

Electra puts £250,000 into hand-held terminal firm

ELECTRA Risk Capital has invested over £250,000 in a computer company.

Electra, whose chairman, Michael Stoddart, was a key speaker at the *Computer Weekly* financing conference for computer companies last year, was set up as a result of tax concessions created by the government to encourage risk investment.

The essence of the government scheme is that taxpayers can claim back tax on certain types of investment in the year in which they make their investment.

From an accounting point of view it is a way of treating capital as revenue. The object is to try to get funds, such as those mentioned elsewhere on this page, into operation in the UK.

Stoddart was the first City financier to take up the government scheme and so far the fund has made five computer industry investments.

The latest is in hand-held terminal manufacturer Microfin.

STODDART . . . *First in field.*

Microfin managing director Mirza Fur said the company was experiencing 400% growth but did not have the capital to expand. Electra put up £251,250 for 40% of the shares in the company.

Fur says this will enable Microfin to continue rapid expansion in Europe where 75% of the business is now concentrated.

The hand-held terminal market is one of the smaller market segments in the industry but has begun to experience fairly rapid growth in the past two years.

Microfin has a broad product range which includes hardware and software for use on hand-held terminals.

Fur said part of the Electra money would be used to increase research and development.

SHARES TABLE

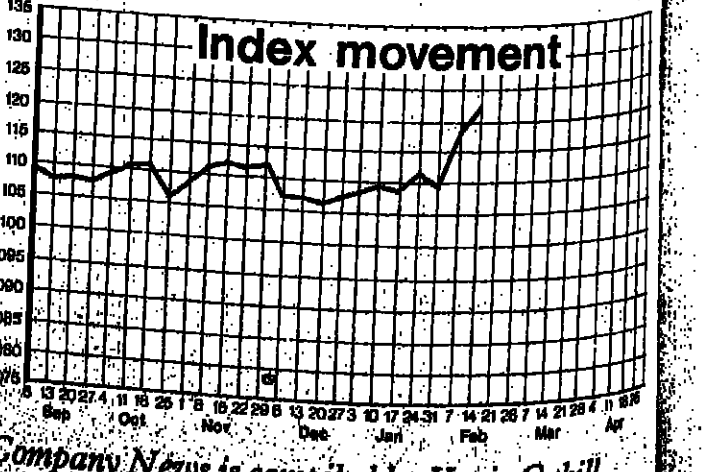
The shares table, which is specially compiled for Computer Weekly, shows selected computer companies that reflect the state of the computer industry.

Date 11/2/83 — Index 122.45 — Change [illegible]

Pence 1983 High	Pence 1983 Low	London Stock Exchange Stock	Pence Price	Pence C'nge
286	253	ACT (App Com) (25p)	286	+ 8
188	176	BOC Int. (25p)	188	+ 6
84	41	B. Boy Kent (25p)	84	+ 6
142	124	Chubb (20p)	142	+ 8
178	150	Cole Group (25p)	158	− 4
209	182	C.A.S.E. (20p)	190	− 18
665	545	De La Rue (25p)	665	—
303	284	Exdal (25p)	303	+ 18
474	411	Ferranti (50p)	471	+ 34
217	182	GEC (5p)	217	+ 18
78	67	ICL (25p)	78	+ 2
44	41	Kalamazoo (10p)	44	+ 1
307	278	Kode Int (25p)	307	+ 30
288	270	Memec (10p)	283	+ 10
190	156	Muirhead (25p)	158	− 1
623	458	N'market (1981) ($0.05)	623	+ 35
1950	987	Norsk Data	1950	+ 226
320	220	Office & Elect (25p)	310	− 10
830	710	Philips Lamp (F1 10)	830	+ 38
629	654	Plessey (50p)	584	− 3
45	40	Quest Auto (10p)	43	—
584	454	Racal Elect (25p)	474	+ 6
260	223	Rediffusion (25p)	233	—
270	252	Star Comp (10p)	270	—
485	418	Thorn-EMI (25p)	485	+ 17
177	138	UC&T (50p)	177	+ 17
		Unlisted Securities Market		
86	80	Bus Comp (10p)	80	—
180	145	Consult (C&S) (10p)	145	− 8
172	158	Int'europe Tech (20p)	163	− 2
247	240	Io Tech (25p)	240	− 3
48	27	Knight (5p)	48	+ 18
258	205	Micro Bus (10p)	250	+ 3
388	340	Microgen (10p)	340	− 10
168	135	Miles 33 (10p)	165	+ 10
173	158	NMW (£1)	172	+ 14
103	81	Rolfe & Nolan (10p)	103	+ 3
170	110	ScanData (10p)	165	− 16
80	78	Trident Comp (10p)	78	—
85	78	Zygal Dyn (5p)	75	− 8
216	160	Memory Comp (ffl 10p)	215	+ 52

$ 1983 High	$ 1983 Low	US Stock	$ Price	$ C'nge
43½	30¼	Amdahl	43⅛	[illegible]
46	28¼	Apple Inc	46	[illegible]
37¼	34¾	Auto Data Pro	36	[illegible]
48¼	43¼	Burroughs	48¾	[illegible]
16	14	Comp Auto	16	[illegible]
22¼	17¼	Comp Sciences	22¾	[illegible]
11½	10¾	Comshare	17½	[illegible]
45	38¾	Control Data	45	[illegible]
48¼	39¼	Cray Research	48¾	[illegible]
61¼	41	Data General	51¾	[illegible]
22½	18¼	Datapoint	22½	[illegible]
36	34½	Dataproducts	36	[illegible]
120	98½	Digital Equip	120	[illegible]
62	47	Elec Data Sys	62	[illegible]
7½	6¼	Gen Automation	7½	[illegible]
44¾	36¼	Harris	44¾	[illegible]
83¾	75¾	Hewlett-Packard	83¾	[illegible]
93	86	Honeywell	81	[illegible]
45¼	40¼	Intel	45¼	[illegible]
99¼	95½	IBM	98¾	[illegible]
59½	54¼	Litton Ind	59¾	[illegible]
17¾	15¼	MDS (Mohawk D)	17¾	[illegible]
25	19	MSA (Mgmnt Sci)	24½	[illegible]
15½	12¼	Mngmnt Assist	15½	[illegible]
14½	11¼	Modular	14½	[illegible]
110	84½	Motorola	110	[illegible]
32	26¼	National Semi	31¾	[illegible]
97½	87½	NCR	97½	[illegible]
32	28½	Perkin-Elmer	32	[illegible]
47¾	37½	Prime	47¾	[illegible]
48¾	44½	Raytheon	48¾	[illegible]
28¾	25¼	Signal	28¾	[illegible]
38½	33½	Sperry Corp	38½	[illegible]
24¼	21½	Storage Tech	23¾	[illegible]
29¼	24¾	Tandem	28¾	[illegible]
56	50¼	Tandy	56	[illegible]
169¼	133¼	Texas Inst	164	[illegible]
23¼	18¾	Tymshare	23¼	[illegible]
34	31¾	Wang Lab B	33½	[illegible]
11¼	9½	Wyly	9½	[illegible]

The table shows the closing prices in London on Friday and in America on Thursday. The Share Index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted where necessary.



Major shares at standstill

DESPITE a rapidly rising stock market on both sides of the Atlantic two key shares, IBM in the US and ICL in the UK, remain stuck at recent levels.

ICL closed the week at 73p, a few pence off the recent high of 76p. Industry analysts suggest that little further movement can be expected until the next significant financial announcement from ICL, due with the half-year figures in April or May.

IBM has failed to break the $100 level, having spent the past month hovering around the post-annual figures level of $95/97.

Analysts contrast the IBM shares, which moved little on the basis of a 22% rise in annual profits, with the DEC shares which bounced to $118/120 from $100 despite a 38% slide in half-year profits. The New York financial community apparently remains suspicious of the accounting move which added over $400 million to the IBM profits.

Company News is compiled by Kevin Cahill

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TIS

The biggest software innovation since database

TIS is a unique product developed by Cincom Systems to meet the needs of large scale IBM users demanding the complete solution to information processing.

Conceived and built to meet the specific requirements of both the professional programmer and end user – TIS is 4th generation data base technology combining relational view and relational structures with high performance.

TIS is an entirely new concept – an entirely new architecture, completely apart from any previous information handling system.

One of the major innovations which sets TIS apart from any other system is its Logical User View component (LUV).

LUV gives the user a relational view of data, completely insulating user programs from the DBMS, data structures, accessing strategies or physical locations. Users no longer need to know file types or locations.

Using just four verbs, "GET", "INSERT", "UPDATE" and "DELETE", two dimensional relational views are delivered to the users.

The result is faster and simpler application development and no further need for program changes due to alterations in hardware, software or data storage.

Also by insulating user interfaces from the physical environment, LUV simplifies the use of high level facilities – TIS batch and on-line Intelligent Query, TIS 4th generation application development system, TIS Batch Retrievals and TIS support for conventional programming.

TIS is compatible with Cincom's range of DB/DC products currently installed by over 5,000 DBMS users.

For more information, details of seminars or a demonstration please contact Jackie Duncan, Marketing Services,
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Telephone: (0628) 72731
Telex: 847198. Or contact our Manchester office.

Cincom Systems
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PLATFORM

Extracts from a speech by Warren Werblow, managing director of Scicon, at a meeting of Vicom earlier this month.

No soft options as industrial nations put up shutters

DOORS are slamming and shutters are going up throughout the world's major industrial countries as a response to prolonged economic stagnation. And it's not just the traditional heavy industries such as cars and steel that are being subjected to protectionist pressure.

It may seem strange to us in Britain, but even the American computer industry now feels itself threatened and there are increasingly strident calls for some form of protectionist retaliation aimed in the Japanese direction, but clearly also threatening other imports.

The world over, exports are good news, imports are bad news. Since our exports are other people's imports it's as well to recognise that simple fact of life and to recognise also that the protectionist climate is hardening.

As a country we haven't really made much headway in recent years in software exports. We have tended to shelter behind a reputation that says that, like Muhammad Ali, "We're the greatest," whereas, if we're really honest with ourselves, we've tended sometimes to float like the bee and sting like the butterfly.

The language of Shakespeare is the language of programming and, given that headstart, the British software industry is certainly exceedingly good and is recognised as such worldwide. But that's no grounds for complacency.

Rather, let's be self-critical.

First, British software has a deserved reputation for quality, but relative to the size of the markets can we really say we have capitalised on this, with exports running at £50 million and a home market of about £1 billion?

Second, it seems to me that the native British software industry – and here I'm being chauvinist as well as protectionist – is in some danger of being absorbed by outside interests. We have had some of our significant companies acquired by, dare I say it, foreigners. And we've had foreign-owned companies taking advantage of our relatively low salary structures either to tempt away our software talent overseas or to use them to staff software laboratories that they establish in the UK. I agree that our industry is multinational in character and that other major benefits may accrue to the nation from such activities and, further, that the software they develop is used internationally. But are the revenues so generated to be regarded as British exports?

Third, there have been some well publicised failures to get the British software industry moving in concert to tackle export markets and we shouldn't forget this.

For example, about 12 years ago there was a move to bring French and British software groups together both in defence of home markets and in building stronger organisations to take on other world markets. A link was established but was relatively short-lived and unproductive.

Then we had the Insac episode, set up by the National Enterprise Board (at the same time as Nexos, incidentally), to push British software exports in the US. Scicon was never a participant in Insac, but it has to be said that, despite a great many start-up problems, Insac did get a few products going in a difficult market. But then support for the enterprise was withdrawn.

The attitude was that Insac could not continue because it represented an open-ended commitment to spend taxpayers' money – it had spent between £3m and £4m – and because its participants could never quite see eye-to-eye in promoting any product developed by one of their number. It was not the function of the NEB, evidently, to coax software primadonnas into working with each other.

One, probably crucial, flaw in the Insac arrangements was that Insac never directly held any shares in the participating software houses. Had it done so, there might have been the real commitment that was conspicuously missing.

So much then for some of the failings of the British software industry and some of the pitfalls and threats that face us in the big world out there. It's the old story. Yes, we're bright technically and good at developing products. But, no, we haven't marketed them to anything like the degree that we should have achieved.

From our experience in world markets over the last 22 years there are a number of lessons that we have learnt, upon which it may be possible to build.

The most basic lesson is that to succeed true commitment is required, with an awareness of the needs and customs of the local market.

There are a number of ways in which business can be grown overseas; for instance, you can set up an office and begin to trade using expatriates and/or local staff; you can buy a local company; and you can employ agents and distributors.

Government must be encouraged to create the right environment for enterprise. The Department of Industry's Invest in Britain team have been successful at attracting foreign firms in the high technology industries into the UK, and this has created new jobs. These include companies making computer hardware, video recorders and robots. But we must ensure that government pays attention to the UK-based IT industry.

And we must be aware of what our competitors are doing. For example, the French are developing the grandest plan of all for the electronics industry, La Filière Electronique. This five-year global plan calls for investment of Ffr 140 billion – equal to more than one-fifth of the total French budget. The objective is an industrial strategy for electronics in every possible field from computers, micro-chips, software, office automation, military electronics right down to telecommunications, home electronics, and cable TV.

Apparently one half of this massive investment will come from the public purse, and the remainder from private financing for which a framework has been designed – such as joint ventures between public research laboratories and private firms, preferential loans for companies developing the kind of product earmarked by the plan, public orders to selected companies, and even joint development with foreign companies of carefully selected products.

Against this background our government should support research and development of software products which means, of course, implementing the recommendations of the Alvey Report and placing increased commitment into operations like the Software Products Support Scheme.

Warren Werblow

PROFILE

Financier's approach is plain logic at this systems house

IT is becoming more common for financial people to be found in senior positions in software and systems houses, though in the 1960s it was rare for people to shift into software from finance houses.

But Alan Thomas has already made one shift of career field, from mechanical engineer to working for ICFC (Industrial and Commercial Finance Company) and, in the late Sixties, was ready to make another change when the then small Data Logic asked him to come on board.

After ten years at the helm of Data Logic, Thomas retains the financier's approach to the company in that he reckons that it has always been the most profitable UK systems house. And he takes some pride in pointing out that the company's turnover has jumped from £1 million to £26 million since it was taken over in 1976 by US giant Raytheon.

"We did take in other Raytheon subsidiaries, but it's still 40% compound growth," he said.

Taking on these subsidiaries, mostly parts of electronics firm Cosser and with a couple of acquisitions on the way, has meant that Data Logic does not fit the standard pattern for UK systems houses.

Thomas said, "I think we have the ideal balance. About half our sales are products and the other half services. We have, for instance, 10% of the UK terminals market.

"This means we can support what is probably the largest base of customer engineers of any systems house – we have 180. And it's the right combination for building up our skills in integrating systems."

THOMAS . . . "In the knowledge business people are demanding, intolerant and idiosyncratic."

The outlook between the two sides of the business is subtly different as well, he points out "On the products side you tend to have customers, as opposed to having clients on the software side."

"People pay money for hardware, even if it's the system that they are buying. It's much more difficult to get money for software products."

And in case anyone should think Thomas is making a virtue out of the necessity imposed by Ra ownership he is categorical the fact that the takeover by a billion a year group was agreed.

Data Logic's growth has self-financed. That is not Raytheon wouldn't stump up major project, but so far, way to a £50 million turnover 1985, Data Logic has financed self.

As for Raytheon, Thomas "They understand people. understand the knowledge ness. They know that the people it are demanding, intolerant idiosyncratic. They are the people who can scale the p

Thomas won't own up ately to any outside inte claiming the general shorta time, and facetiously replied one of his main interests was ing micros out of his own h

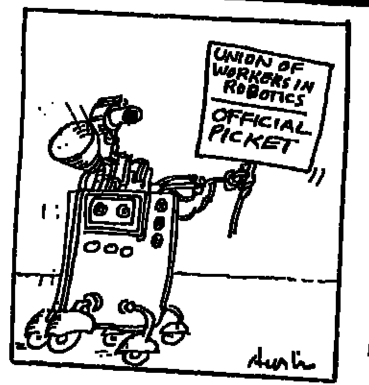
It's also an unsuccessful he confessed that it battle he had lost and that, pressure from his sons, he was pecting one imminently – wouldn't divulge the make.

He is, however, a keen r fan, at least when Wales is pl and will own up to a more passing interest in jazz.

For the future, Thomas in keep Data Logic in large and quoted a recent order million for a word proc system from top accountant Waterhouse as an example

DOWNTIME

Brother robot



UNION OF WORKERS IN ROBOTICS
OFFICIAL PICKET

TRADE unions are traditionally opposed to new forms of technology.

But in Japan unions have more cause for concern – they are fighting for their very existence.

The increased use of robots at the Fujitsu Fanuc plant has meant a significant reduction in manpower, and a commensurate reduction in union contributions.

Union officials thought they had the problem solved when they gained agreement from the management to run a closed shop. All workers, man or machine, had to join and pay union dues. It then occurred that there was one small snag – the robots didn't actually get paid, so couldn't cough up.

Again management and union officials met, and a solution was found: the company would pay the robots the amount required of them in union dues. All was once again well. Or it *was* until the Japanese government stepped in, pointing out that it was illegal for the company to pay union dues out of its own funds.

Now the union is working on another solution to this fiscal fiasco – it wants to increase the union dues paid by its remaining humans to cover the shortfall.

Who will pay? Why, Fujitsu of course: the workers' salaries will have to be increased to cover the extra cash demanded by the union.

Never take no for an answer

COMPUTER hacks are famed for an ability to cling tenaciously to a line of questioning until the unfortunate victim gives us the answers we want to hear. And at the UK launch of the new Apple Lisa system, one reportette gave a fine display of such single-minded tenacity.

"Can you tell us what proportion of sales will be handled by your dealers as opposed to direct sales?" was the searching question.

"We only sell through dealers," came the reply. "We don't sell direct at all."

This reply obviously wasn't what the lady was after: "Yes, but what proportion of sales will the dealers handle?" she demanded.

The Apple man considered for a moment, then replied, with a straight face, "About 100%".

Collapse of stout party.

Christmas Eve reunion

THE Police National Computer at Hendon comes in for more than its fair share of knocking, so it is refreshing to report on a case of car theft in which the victim was reunited with his missing vehicle following a licence number check via the PNC.

It was Christmas Eve, and a reveller had spent his evening, rather unwisely, ensconced in the saloon bar of the *Dog and Bucket*.

Before he had travelled more than a few miles homewards in his Rover 3500, he was greeted with the sight of another Rover, painted with festive orange decorations and sporting a blue fairylight on the roof, waving him down.

"Good evening sir," said the occupant, "I wonder if you'd mind stepping out of the car for a moment and blowing into this bag."

"Shertainly oshifer," replied our unwise friend, climbing out of the car and placing the breathalyser to his lips. But before he could expose the crystals to his alcohol-ridden breath, there came a squeal of brakes, followed by a sickening crunch, followed by the tinkling of glass, followed by a silence punctuated by the policeman's terse instruction:

"Just wait here a minute sir, while I sort this out."

Two crumpled Cortinas had run into the back of two mangled Maxis. Seeing his chance through the alcoholic haze, our hero jumped into the Rover and raced off into the night.

Arriving home, he managed to place the car in the garage, and went to bed. An hour or so there was a knock on the door, the man was confronted with unsmiling officer of the law.

"Are you the owner of a Rover, registration number 88Y?"

"Er, yes, what's the trouble"

"Can you account for movements this evening sir"

"Yes, I've been in bed, feel too well actually."

"I see sir. Can anyone back up?"

"I'm afraid not, my wife away."

"I see sir. Would you showing me the vehicle?"

"Of course not officer, it's garage."

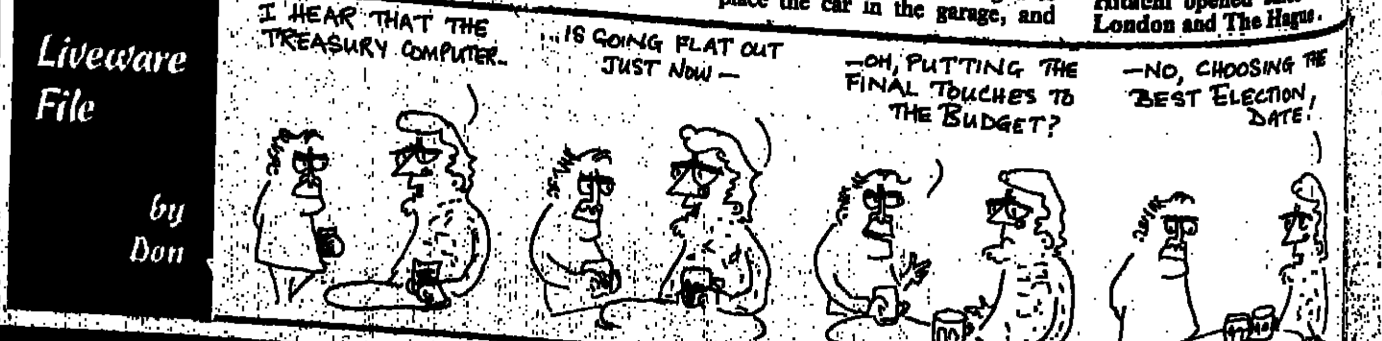
The man led the policeman the garage, and opened the do Turning on the light, he beg

"There you are off. . . .

"How long has your car had blue flashing light on the roof

10 YEARS A

FROM COMPUTER WEEK OF FEBRUARY 15, 1973. ICL 1904S computers, about £1.6 million, were by the Department of Health Social Security to process ployment benefit for people Scotland and the North of land – an estimated £100 in payments a year . . . Prep for a large-scale invasion of European computer marke Hitachi opened sales office London and The Hague.



Liveware File
by Don
I HEAR THAT THE TREASURY COMPUTER–
..IS GOING FLAT OUT JUST NOW –
–OH, PUTTING THE FINAL TOUCHES TO THE BUDGET?
–NO, CHOOSING THE BEST ELECTION DATE!

ComputerWeekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, February 17, 1983

Not much time to get IT together

OUT of business by 1990? That is the dire prognosis for the UK information technology industry if it does not soon get its act together.

Source of the prediction is the National Economic Development Office, which this week published a report from its Information Technology Sector Working Party. The working party is made up of industry, unions, and government leaders, and at least in the past has had some infulence on government policy.

The report follows by a week NEDO's response to the Alvey Committee's recommendations, for a programme for advanced information technology; taken together the two NEDO documents are evidence of the growing pressure on government to put its intentions into a structured strategy.

There is no suggestion that these calls for a national policy on information technology are falling on deaf ears: the sector working party agrees that the government has been "positive and vigorous" in promoting IT.

But as Doug Eycions, director-general of the Computing Services Association said this week, "It's taking industry and government longer to respond to Alvey's recommendations than it took to produce the report in the first place." And every day that passes sees the UK's chances of keeping up with its major competitors gradually disappearing.

It is the slowness to respond to the urgent need for an information technology policy that is the basis for the working party's gloomy predictions for 1990. NEDO spreads the blame fairly evenly among government, industry, unions, and users for our failure to make more headway in international markets. But it is clear that the government is responsible for the leadership on this issue; it must provide the framework, and until that framework is established the UK's potential for success in world IT markets must only diminish.

The government is no doubt well aware of the urgency of its task.

Yet it is curious how little public debate there has been since the Alvey report came out last autumn. For some while after the report appeared there seemed almost a to be a ban on its mention in public by government ministers. Since then there have been general statements by Patrick Jenkin, John Butcher, and others saying they support the general principles of the report.

But the government's intentions are being kept close to the chest.

As the NEDO working party points out, the small and fragmented UK market is not ideally suited to compete in the high-volume, broadly-based international market; and while there have been a number of initiatives to stimulate the UK IT industry, they have been largely unco-ordinated, and have resulted in competition for limited resources and expertise.

And who are the main competitors: In the US, NEDO says, where the IT industry owes much of its success to massive government spending in military and space programmes and the Buy American Act (see page 8), the US government has spent $10 to $15 billion annually on computers, and government spending on software will total $50 billion between 1980 and 1985 (compare that with the £350 million over five years recommended by Alvey). Add to that the enormous US market for its own products, and one can understand some of the difficulties the UK faces.

In Japan, NEDO points to the centrally planned policy which started in the late 1950s and now ensures that Japanese computer companies were able to supply 50% of their domestic market in 1981/82; and that market now is claimed to be the second largest in the world at $5 billion.

Does the UK have a realistic hope against that kind of competition from the US and Japan, not to mention the French and West Germans? It might do, if we had a policy which played to our strengths.

The Chancellor will announce his Budget next month, and it may be that a national programme for information technology will feature in it.

We hope so. The growing consensus is that time is not on our side.

1984 and all that . . .

THIS week's example of the strange things people say about computers was sent in by Bruce Hughes of Glasgow, who wins £5.

A computerised cleaning system for Glasgow is set to produce a new breed of super binman.

Glasgow Evening Times

LETTERS

Finance for computers

I WAS rather dismayed to read the article If at First You Don't Succeed Try the ICFC (CW, January 20) on finance for the computer industry.

Dismayed, because the article completely overlooked the substantial investment activities of the BTG in this important and growing sector. While I understand that the author's brief was to look principally at private sector sources of finance, you should be aware that virtually all of our investments have been made in partnership with many of the financial institutions referred to in the article.

MINOO RANDERIA
Director, Electronics and Information
British Technology Group
Technology Investment Division

Eicon sales

IN your item (CW, January 20) regarding the BACS software, there appears to have been either a misprint or some misunderstanding in the last paragraph about Eicon Research.

It should have said two or three drives per week are made for the BACS or similar applications, not two or three drives for all applications.

We cannot support an expanding company on three sales per week.

J. E. HARTLEY
Director
Eicon Research
Cambridge.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics.

Two and two

AFTER reading Computer Weekly (February 3), I am tempted to put 2 and 2 together.

"Writing software is rather like doing an electronic crossword", was your strange saying from the Sunday Times. If you think that is strange you obviously don't have to de-bug many Basic programs.

In the same issue George Black quotes Chris Beattie of Westminster School: "Teachers are fooling themselves if they think their pupils are learning to compute by using Basic".

You see George, what they are learning is how to do electronic crosswords!

DAVID CORNES
Computer teacher
Hephaistos School
Farley Hill, Reading.

Plea to fellow sufferers

I AM sure I can't be the only Nexos 2200 user who has been extremely frustrated by the way in which Close Up in ICL's 4.2 Wordskil software generates unwanted blank lines and even blank pages.

In the old 3.2 (which I've been driven back to!) the cursor, on Close Up, ran ahead of the next return symbol and tidied up any spare lines left over from a deletion or insertion. Now it closes only to the return symbol, leaving spare lines which have to be individually deleted, and in the event one has closed up the last paragraph of a document in order to bring a widow forward from its final page, the system now insists on printing that page even if there is nothing on it bar the number and/or title -- a terrible waste of time and paper.

May I appeal to other Nexos users who are suffering the same sort of frustration to get in touch with me? Perhaps if we send a joint letter to the ICL software people we may get the superior version of Close Up restored.

JOHN BRUNNER
Director
Brunner Fact and Fiction
The Square House
Palmer Street
South Petherton, Somerset

ICL gives choice of supplier

IN your article, ICL Gives Users Choice of Supplier (CW, January 13) you correctly report that Memorex is now a licensed supplier of ICL brand media.

But the article gives the incorrect impression that Memorex disc packs failed ICL technical evaluation at Kidsgrove.

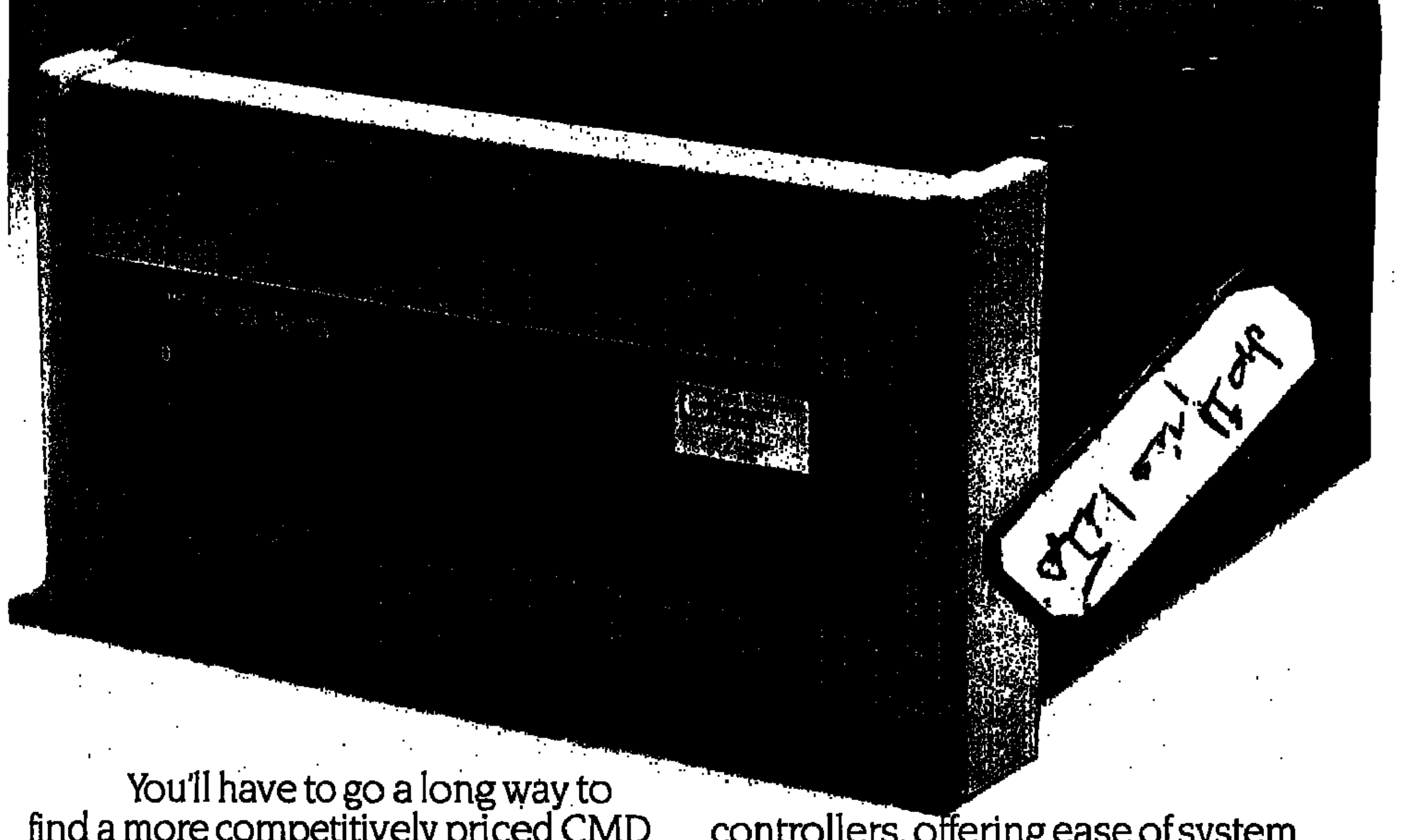
Let me assure you this was not the case.

Memorex disc packs are excluded from the agreement with ICL, not because of any failure on technical grounds but because of existing commercial agreements between ICL and Control Data Corporation.

EDWARD B. PICKEN
Director, Media
Memorex
Staines, Middlesex.

Although it was not our intention to imply that the Memorex discs failed the ICL approval tests, Memorex did submit samples for testing and did not receive approval to market them under the ICL name. – Editor

UK CMDs AT OK PRICES.



You'll have to go a long way to find a more competitively priced CMD than the Newbury Data D9448.

Not only that, but the D9448 is British made. Which means it's the best supported product of it's type you can buy.

It incorporates a front insertable, top-loading cartridge of 16 Mbytes removable capacity.

Plus fixed discs providing a fixed capacity of 16, 48 or 80 Mbytes.

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Jobs directory poses a threat to the agencies

AN alternative source of contract programmers and analysts is now running successfully alongside the agencies that have dominated the market since the early Seventies. NCCD, National Computer Contract Directory, launched in November 1982 by Willoway, has 60 subscribing companies including big names like ICI and Barclays Bank as well as software groups.

The directory now lists nearly 3,000 contractors and has found work for at least 25, including 11 for the Middle East and four for Holland. The total would sustain a medium-sized agency, and more contracts are expected soon, since many of the subscribing companies have yet to use it.

It costs companies £380 to subscribe to NCCD, for which they receive the directory itself and monthly updates. The directory gives a brief curriculum vitae of each contractor, and states whether the person is operating as a limited company.

NCCD advertises for contractors just as the agencies do, except that specific job requirements are not mentioned. Contractors fill in the details, which are fed into NCCD's Altos computer system and added to the directory as soon as possible.

Already about half the estimated UK total of 6,000 contractors have signed on. Contract operators are not included in the directory.

When a company has a contract requirement, it phones NCCD, which will do a search on its computer for likely candidates. If the requirement is too broad, like asking for an IBM Cobol person, NCCD will suggest tightening the requirement, explains manager David Coffey. By the same token, if the requirement is so stringent that the search elicits not a single candidate, then Coffey will suggest relaxing the specification.

When a suitable list of candidates has been agreed, NCCD will phone or write to them that day giving details of the company. The matched candidates then contact the subscribing company, which can flip through the directory to the relevant entry. Interviews can quickly follow.

NCCD has already hit back at the agencies which argued that it would fail because it would involve subscribing companies in too much work, or because it would lack the human touch. NCCD does help companies get their requirements right, and it more or less guarantees that contractors will approach them; although, as one subscriber told me, there is some riff-raff on the directory, a result of the contractor having nothing to lose by being listed.

NCCD does not arrange the interview, or negotiate pay. So a company must decide if the cost of doing this itself is met from the saving made by cutting out the agency fee.

One company that shall be nameless has taken a Cobol woman on contract through NCCD, and thinks the saving just worthwhile. "It took 13 or 14 phone calls and a week or ten days," says a spokesman, "much quicker than going through an agency.

"But I expected to pay a little less," he adds. The agreed weekly wage was £450 as opposed to the £390 or so the company expected to pay. Clearly the contractors are determined to take their slice of the agency fee saved.

Computer Automation took on a technical author from NCCD to write the user documentation for a data dictionary and data entry package. The trouble with technical writers, explains Alan Colvin, of CA, is that they are often failed programmers hoping for a cushy job. "We really needed a good technical writer."

There were two choices: either go to one of the companies like Intereurope that specialises in technical documentation, or get a contractor. The trouble with the specialist companies is the great expense, says Colvin, although the quality of their work is excellent. So he approached Coffey at NCCD.

"David came back next day with a name," says Colvin.

"We interviewed, and gave him the job."

The work took a month for a fixed charge of £1,000, compared with about £3,000 quoted by the specialist companies.

"NCCD produced the right person very quickly," says Colvin. "But I knew what I wanted."

The lucky contractor was Lester Arthur Stone. "That was one of the best jobs I've had," he enthused. Stone sees an advantage in NCCD in that you talk about the job first and then negotiate the wage directly.

The agencies might deny it, but they are pretty scared by NCCD. Coffey says that several smaller agencies have moled their way into the directory by posing as contractors, and he showed me an example.

"You can tell those moles," he says. "The experience stated is always good, and suspiciously round numbers are given in the box for months of experience."

Contractors who find work through NCCD can expect to earn more than their agency siblings, and to give them an idea of how much daily bread to seek, Coffey initiated a pay survey. A skeleton of the results is given below.

COFFEY . . . *Unearthed agency moles on his contractors' directory.*

Do-it-yourself contract staff earn 15% more

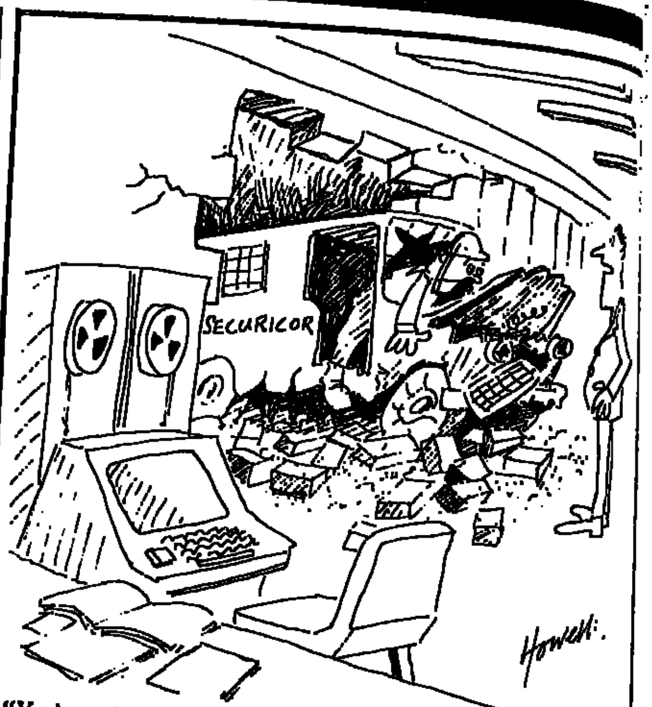
	Prog	Anal/ prog	Anal	Sys prog	Consultants, sys designers
LONDON & SE:					
Through agency	£350	£400	£465	£500	£425
Direct negotiation	£455	£412	£550	£525	£600
ELSEWHERE					
Through agency	£375	£375	£427	£430	—
Direct negotiation	£425	£450	£525	£615	£525

THE figures are based on questionnaires returned from 796 contractors. Each figure is a median which divides its group into two equal halves, one half earning less than the median, the other half more. For each of two areas, the Home Counties and the remainder of the UK, two figures are given for each job category: one is the median for contractors who negotiate directly with the user they work for, the other figure is the median for contractors employed and paid by agencies.

ONE of the most comprehensive surveys of contractors' pay has just been completed by NCCD, the National Computer Contract Directory. The idea is to give subscribing companies an idea of how much to pay contract programmers and analysts according to the area and job category.

There are 796 contractors included in the survey. Clearly some of the figures are distorted by individual extremes, but one trend is inescapable: contractors who negotiate directly earn far more than their colleagues paid by agencies. On average it is about 15% more.

Companies have to bear this in mind when calculating savings made by negotiating directly with contractors through NCCD. Agencies typically charge 35% more than they pay the contractor, so the company can expect to save about 20% of what the contractor would earn from the agency.



"You're early! We haven't finished payroll yet."

Beware of these five bug types

THE diversity of program bug types would have delighted Charles Darwin, but mostly they fall into five categories: Infinite loops, variables unset, variables overwritten, off-by-one errors, and boundary conditions.

These categories often overlap. For example, a piece of code might be executed every time a certain variable fails to exceed a given value. If the variable is never set, this code will be continually executed.

Off-by-one errors are not hard to spot. Usually they simply involve executing a loop of code once too often, or not often enough. There is no excuse for unset variables.

The difficult ones are overwritten variables and boundary condition errors, because they occur only with certain data values, and might only be brought to justice after many successful executions of the program.

Boundary condition errors occur only at extreme values, such as when a loop of code normally executed many times is completely by-passed.

As for overwritten variables, a harrowing example was recently given to me from a Fortran program. It concerned the ENCODE statement for reformatting data during execution, only found as a de luxe feature in non-standard versions of the language such as Control Data and Harris provide.

The purpose of ENCODE is to move data around and chop it up so that it can be used in different ways. Its effect can be pernicious indeed as one poor programmer discovered at the cost of two weeks' distraction.

The unlucky man found that one of his sub-programs was overwriting some data variables, yet there was not a single statement that seemed responsible for the action.

In the end, it proved to be an ENCODE statement. Too many bits of central memory had been reserved for the action, and these had all been reset to zero even though this erased other variables not listed in the statement.

Moral: Beware of de luxe features of languages.

Recursion is so simple

RECURSION is the key to several emerging computer languages, including Prolog, which is gaining favour for applications of artificial intelligence.

No technical programmer is worth his carrots without it. But what is it?

As often, an example saves column space. Suppose we want a program to calculate series of Fibonacci numbers. The first two numbers of the series are one, and the remainder are formed by adding the previous two numbers together. So the third is one and one, which is two, and the fourth number is three.

The Nth number we shall write as F(N). Then: F(N)=F(N-1)+F(N-2). This is a recursive definition, since a program has to calculate F(N-1) in order to calculate F(N), and has to find F(N-2) to find F(N-1) and so on until it comes to F(1) and F(2) which we have already defined as being equal to one.

Recursion is sometimes called self-reference, and a recursive program is one that is continually referring to itself working backwards until it comes to something already known.

The idea is simple, yet non-mathematicians shudder when they hear it. The walls of jargon that technical people put up are in part to blame.

PUZZLER

THIS week we have a "skeletal" division sum from across the channel. Can you fill in the missing figures? Voir page 53 si confondu.

```
QUI ) TROUVE ( CECI
      x x x
      -----
       x x x
       x x x
       -----
         x x x
         x x E
         -----
           x x x
           x x E
           -----
```

"Perhaps the last system to process accounts in £sd."

£sd a museum piece

by John Riley

PERHAPS the last computer application still processing business accounts in good old-fashioned £sd can be found in the Museum of London.

The late 18th Century trading ledgers of the Whitefriars Glassworks are being entered on to a database, a copy of which will end up with the Museums Documentation Association.

Computerisation of these 18th Century records has shown up a few mistakes in the sums. "We sometimes find that the figures are out by the odd farthing", said a member of the project.

Wendy Evans, co-ordinator of the project said, "The ledgers provide an extraordinarily detailed account of the glass trade. Some 65% of the customers can be identified and most have their addresses, which helps us to build up a picture of the social history of the period."

All the records are being transferred to the Museums Documentation Association data catalogue system called Gos, so that the information can be assessed by other museums or researchers. The MDA aims to ensure compatibility of the structure of computerised databases through the museum service in Britain.

Workplace is compiled by Philip Hunter

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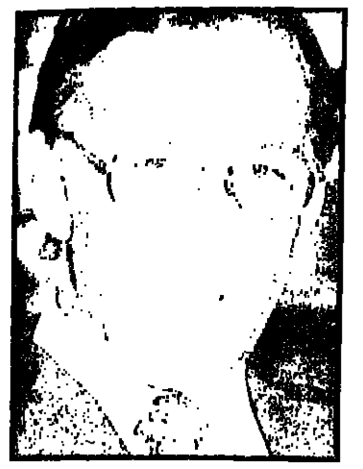
PEOPLE



Kamp

Vice-chairman for CDC co-operative

PRESIDENT of Control Data's Peripheral Products company has been elected vice-chairman of CDC's business and technology co-operative ventures. Thomas Kamp will be responsible for the direction and co-ordination of co-operative business ventures, and for the implementation of programs that deal with technology exchange.

Kamp was instrumental in the formation of Magnetic Peripherals and Computer Peripherals, two of Control Data's largest joint ventures.

He joined the company in 1957. He became a vice-president in 1965 and president of the Peripheral Products company in 1973. In 1977 he was elected to the company's board of directors.

Kamp will be succeeded as president of the Peripheral Products company by Gordon Brown, who joined CDC in 1967

- **Martin Peacock** has joined Confederation Life Insurance as manager. He will oversee the installation of the company's new IBM 4341 DLPS computer, which is being brought in to replace the existing Hewlett-Packard. He is a Fellow of the IDPM.

- Amdahl (UK) has appointed **Steve Coggins** (below) as general manager of the company's operations in the Benelux countries. He joined the company in 1977 as a consultant systems engineer. He then became marketing manager and later support manager for the Northern European marketing region.

- **Chris Toone** (above) has been appointed director of systems development and consulting for Geisco's Northern European region. He was previously managing director of AGB Computer Services, and before that was a director with ICL.

- **Colin Williams** has been appointed production manager at Data Type's new factory in Cwmbran, South Wales. He was formerly in a similar job with Aiwa.

- **Howard Kornstein** has been appointed European director of technical support for Digital Research. He joins the company from Intel where he was technical support manager. Also joining Digital Research is Frank Iveson, who has been appointed director of Northern European operations. He was previously sales manager with Cambridge Interactive Systems.

- Central Television has appointed **Tony Salmon** as head of information services responsible for all of Central's requirements in computing, information technology and communications techniques. He was formerly with ATV as a member of its development group.

- **Bob Jennison** has been appointed regional sales manager for South and West England at MDS Computer Systems. He was a sales manager at ICL for seven years before joining MDS.

- **Kath Stepien** has been appointed to augment the technical sales support team at Pete and Pam Computers in Lancashire. She joins the company from the Compugraphic division of Gestetner, where she was in communications sales support.

Computer software firm Tridata Micros has appointed six new members of staff. Left to right are: Bob Smith, technical writer; Russell Cheakley, systems analyst; Mike Gaunt, programmer; Ray Heppell, sales and marketing manager; Jim Whitehead, programmer; and Terry Evans, who joins the customer support team.

DIARY

FEBRUARY 21

Planning for a disaster. BCS Glasgow branch. Music Room, Staff Club, University of Strathclyde, John Street, Glasgow. 7.00.

The biological computer. BCS Merseyside branch. Department of Electrical Engineering, Liverpool University, Brownlow Hill. 6.00.

FEBRUARY 23

Royal Institution Lecture by P. Cloot of Barclays Bank. BSC Humberside branch. University of Hull. 7.30.

FEBRUARY 24

Artificial Intelligence. BCS Primary Care group. Details from Dr Mike Sheldon on (0602) 700111.

FEBRUARY 27-28

Meeting. BCS Primary Care group. Royal College of General Practitioners. Details from Dr Mike Sheldon on (0602) 700111.

COURSES

- **KEITH London Associates** is running a series of five-day residential workshops on computer systems design. A technical course, it teaches the design and implementation of computer-based systems. It costs £580 + VAT, including five nights' accommodation. The course will be held in Welwyn Garden City on April 24-29; July 17-22; and October 16-21. Details: Welwyn Garden City (07073) 30014.

- *MANAGER* development courses tailored to the needs of the computer industry are being run by **Actionline (Business Consultants)**. The courses aim to equip managers with the knowledge, skill and attitudes necessary to achieve specific goals and targets, covering motivation, delegation, leadership and team-building, project management and problem solving. They are normally run in-house. Further details from Actionline, Englefield Estate Office, Englefield Road, Theale, Reading. Tel: (0734) 303404.

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Teachers and pupils are the losers in the Scots schools battle

Jennifer Boswell discusses the latest report about the Scottish Microelectronics Development Programme

THE £1 million scheme to equip Scottish schools with microcomputers has come under fire in an independent evaluation published recently.

The Scottish Microelectronics Development Programme (SMDP), which was launched at the same time as the Microelectronics Education Programme for the rest of the UK has run over half of its intended life-span. An earlier report painted a gloomy picture of the lack of success of the programme, and researchers Phil Odor and Professor Noel Entwistle, both of Edinburgh University, fill in the details in their new assessment.

After SMDP's first nine months, Odor warned its steering committee of "disquieting features" emerging in its 68 project centres. Teachers were disenchanted at the lack of support they had received and there was a "widespread sense of isolation", he reported.

HM Chief Inspector Ian Morris claimed that the criticisms "had been taken on board", but the new report not only confirms the early warnings, but goes further. Bad management, poor communications and the total lack of a coherent strategy – all are documented in remorseless detail.

Extensive evidence was gathered during in-depth interviews and a 107-item questionnaire. The only problems which are shown to have been dealt with are the lack of printers and appropriate insurance cover which existed formerly.

A total of 106 teachers in SMDP's 68 project schools and colleges are the supposed beneficiaries of government spending which averages around £10,000 per project teacher. They are unimpressed with the programme's performance. Table 1 shows their assessment of SMDP's performance on four of its aims.

The responses show strong agreement on the importance of these tasks. Yet the proportion who thought SMDP's progress could be rated "reasonable" or better on any of them is very low.

Only on the general awareness aim did the total of teachers saying "reasonable", "good" or "very good" manage to outnumber those who were unable or unwilling to respond. On other aims (not reproduced here) the numbers of satisfied teachers sank even lower, in three cases below 10%.

As postal questionnaires go, this one achieved a high response rate (80%) and was sent only to teachers directly involved in SMDP. Its results therefore deserve to be taken seriously. They present an extraordinarily damning picture.

The project teachers' rating of "support received from SMDP" in the shape of visits, advice by phone or post and the software library are equally negative. Between 16% and 38% said that they had had no help in these various ways, another 20% to 28% said "not required" or "not applicable", and between 20% and 31% made no response.

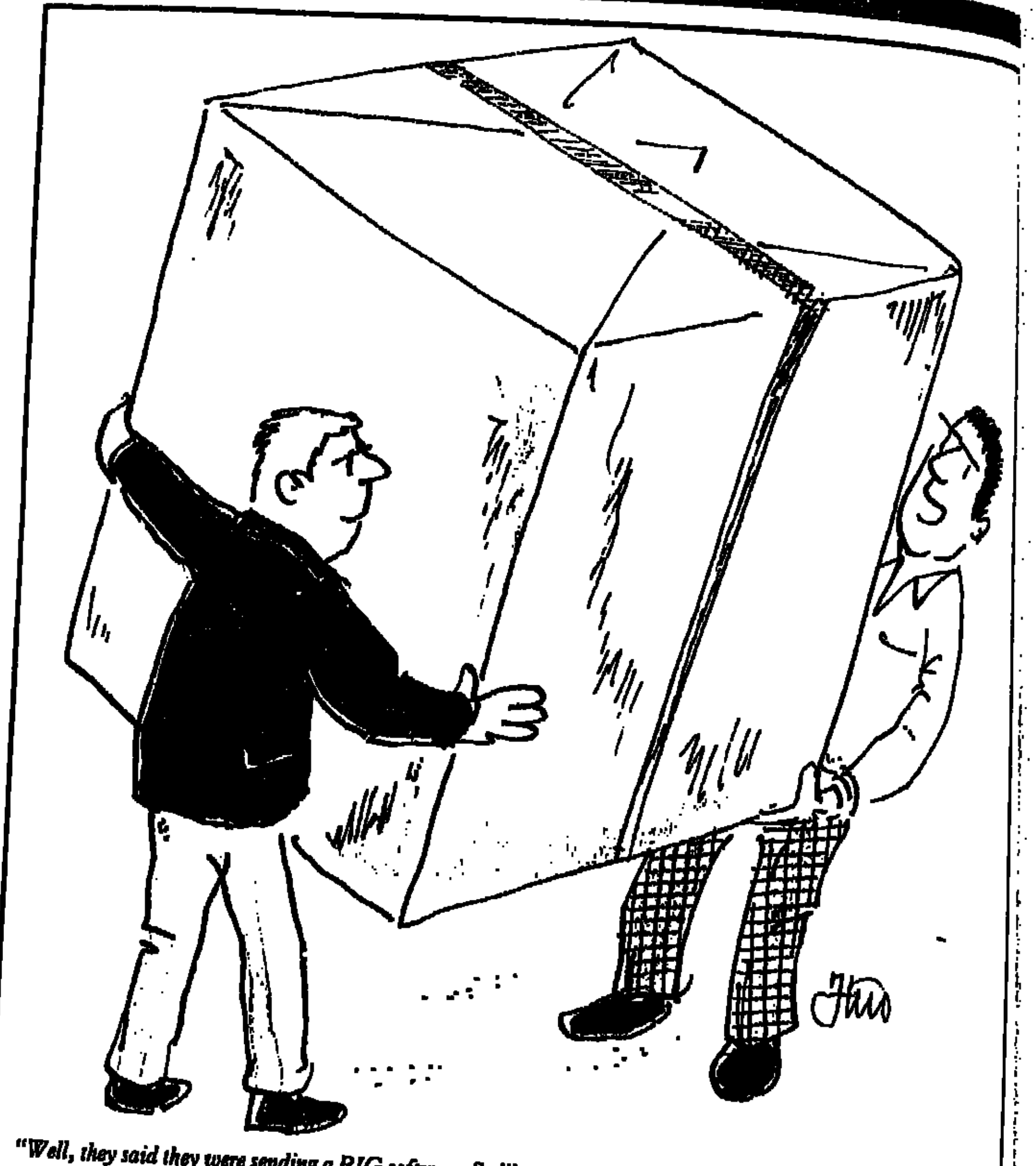
The remainder were quite critical of such "support". The technicians' visits, telephoned advice, information service and seminars/conferences were rated "fair" or "poor" more often than "good" or "very good". These low ratings were amplified by spontaneous comments: "We have supported SMDP rather than the reverse"; "The programmers' visits have invariably been to take away programs, never to give help"; "The most crucial issue would seem to be exchange of information – will SMDP beome much more successful in this? Surely it must . . ."; "Increase the number of programmers . . . I begin to doubt if there are such people." The evaluators are in no doubt about where the responsibility for the programme's failure lies. From the outset, the Scottish Education Department adopted and maintained a heavy-handed role. The report documents "how determined was the SED to retain control over the management of SMDP".

Its main avenue of control was the steering committee, chaired by Morris and packed with other civil servants. At no stage were representatives of teachers' organisations or of the SMDP project staff given a single place or even observer status.

> **The evaluators are in no doubt about where responsibility for the programme's failure lies. From the outset, the Scottish Education Department maintained a heavy-handed role. The report documents "how determined was the SED to retain control over the management of SMDP"**

Even if they had been, they might have been frustrated by the way in which this committee was run. The impotence of the non-SED members of the steering committee is openly voiced in the report: "We seem to be steering a different programme each time we meet," complained one; another objected to having to "rubber-stamp" decisions taken by SED.

The proliferation of tasks imposed by the steering committee caused SMDP staff to work "under considerable pressure".



"Well, they said they were sending a BIG software fix!"

"Strong ministerial interest" and "constantly changing priorities" cannot have helped clear thinking.

According to the report, "the heavy demands made on the staff have also created an atmosphere of crisis management. The director has found it difficult to develop a coherent policy for the use of his manpower . . . He has had to leave the development of policy to the steering committee . . . that has generally meant the acceptance . . . of SED plans. Thus the work of SMDP has continued to be very firmly controlled by SED . . ."

The report attributes some of the problems to the low value placed on educational development in relation to computer expertise. The first deputy director left the programme in 1982, and the evaluators note that "there is no-one in the current SMDP staff with a strong background in educational technology". Her departure seems itself to have been symbolic of the controversy over the management and direction of the programme and the role of SED as puppet-master. A formal protest by the chairman of SCET followed and a member of the steering committee resigned.

The evaluators are careful, here and elsewhere, to explain the constraints and to avoid allocating blame. Indeed, their candid analysis of failure and its causes cannot have been an enviable task for researchers who were commissioned by SED and whose research projects depend to some extent on government funding. In many ways this is a very brave piece of research in the face of what must have been considerable pressure to whitewash.

The section entitled "The achievements of SMDP" conveys the flavour of the report. One of the five sub-headings is the software library and information service. The software collection has disappointed teachers by its slow growth. Only 27 "supported" programs had been produced by June 1982, of which some were utilities and others produced elsewhere before SMDP. Little of the "unsupported" library material "would be immediately usable as it lacks appropriate documentation". The information service "has been swamped with telephonic and postal requests with which it cannot cope . . . SMDP has been widely criticised in the regions for its failure to make satisfactory responses, or indeed on occasions any response, to the queries."

The authors are at pains to explain that SMDP staff are not qualified to deal with many of the queries received, and that more resources are needed for the software library.

Nevertheless, there is little in this or any other section to justify the breathtaking non sequitur.

"This brief summary of SMDP activities provides clear indication of substantial progress towards the objectives originally identified". Standing in marked contrast with the preceding 52 pages, this sounds as if destined for a Press release.

SMDP spends only taxpayers' money. Scottish Office Education Minister Alex Fletcher, who has identified himself closely with the programme ever since he officially opened it commented: "The evaluation presented a balanced, frank and detailed picture." Undeterred, director David Walker attacked its credibility, and claimed that it dwells on historical incidents; in fact only two pages out of 67 deal with events prior to 1978.

Eight days before the report was published the government announced how the future would develop. SMDP's life is to be prolonged indefinitely beyond 1984, the Department of Industry is to provide £75,000 for a four-month crash programme to develop software for schools (presumably to help fill the yawning gaps in the SMDP software library), and almost incredibly the Norwegian Education Ministry is to send an official to SMDP's Glasgow offices for a year with a view to adapting the SMDP model to Norway!

What is the Norwegian for "Yes, Minister"?

	General awareness	Software/ information	Teacher education	Curriculum materials	Dissemination/exchange
IMPORTANCE					
Very important or important	85	81	80	75	71
Useful	8	9	5	13	17
Not useful	0	1	3	1	1
Unsure/No Response	8	8	12	10	10
PERFORMANCE					
Very good or good	17	8	8	7	5
Reasonable	27	28	19	17	24
Slow or poor	21	29	18	22	19
Unsure or no response	35	43	56	54	53

Table 1: Ratings of SMDP's aims and performance by 106 project teachers

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[*] "The Introduction of Microelectronics into Scottish Education" by Phil Odor and Noel Entwistle, Department of Education, Edinburgh University. Published December 1982 by Scottish Academic Press, Edinburgh.

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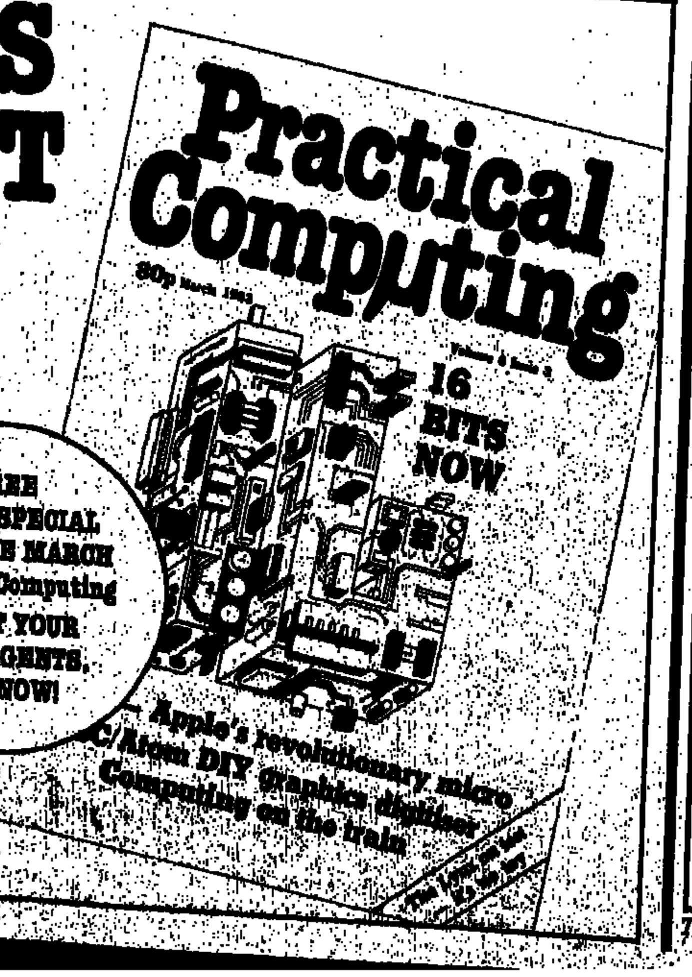


Computing takes a cue from the world of theatre

Hedley Voysey on the role of the actor in programming

SCRIPTWRITERS produce scripts which are given to actors who enact roles based on them.

This well-known state of affairs has provided a flow of ideas for advanced computing technology workers to base plans on. And it all started in the specialist world of artificial intelligence.

For in systems which tackle problems of "understanding", whether it relates to speech or vision, or even just to the selection of useful data out of excess data, there are many tasks which need to be specified in case they have to be done, but which are called on to "play a role" only when affairs in the stream of events call for them to go on stage.

The use of a model, or a view, of the pieces that make up a complex system is growing at a great rate – simply because the complexity of systems thought to be within our grasp is growing.

This is not a new phenomenon, but the explicitness of models and views is something new – the earlier models were largely implicitly taken on board by the computing community.

For instance, every programming language carries an implicit view of what is really important to the systems at which it is aimed. Cobol, for example, sees file updating as the essential theme, while other languages clearly see the events to be dealt with in a more general and abstract context.

In truth, the artificial intelligence students borrowed, maybe unconsciously, the terminology of scripts, actors and roles, from the area of management science and operations research. Certainly, as long ago as 1960, students of interactions between industries, attempting to forecast economic growth and decline, were applying these stylistic conventions to descriptions of how they viewed the goals and options available to economic actors.

One of the earliest uses of this terminology in computing systems applied to the evolution of military real time systems as they attempted to cope with partial failures of the system while still doing some useful (and correct) work.

This is the problem that is often labelled as graceful, versus ungraceful, degradation.

In these studies the actors were assumed to be using telephones to communicate and, as failures happened, these could be represented by being able to make only outgoing calls, or being able to take only incoming calls, not all of which could be taken as based on truthful views of what was happening outside.

This turned out to be a handy way of establishing a strategy for coping with failure and uncertainty generally.

It is especially the ability of scripts to express uncertainty which makes this stylistic convention useful in both office automation studies and robotics studies as applied to industrial automation.

But there is also a more general reason for using these conventions which fixes quite simply on the fact that when a system is aiming at doing a number of tasks in parallel, instead of purely sequentially, the scripting approach gives quite a reasonable approximation for expressing the desired behaviour of the system.

This need to express the behaviour of systems exploiting parallel computation is a deeply felt need. The fact that a dozen or more programming languages are capable of sustaining concurrent computation is not much use if we cannot secure a connection between the desired behaviour of systems programmed in such languages.

There is an obvious, but somewhat misleading, connection with the highly parallel design of data driven, or dataflow machines, and with the actor, role and script conventions. This exists because the principle used in data driven architectures is that a computation happens when the operands it needs turn up. The results are then sent off to wake up some other process.

The reactive nature of some of these designs intended for the fifth generation (so-called) seems the most ideal match for the role enacted as the script demands it.

The match between parallel computation and the script conventions is rather broader than the pure ideas of dataflow.

It is an essential part of an actor that you cannot look inside it, and what is known about it rests on the types of messages it accepts and the kinds of responses it makes. There is no synchronisation of actors, for they just act when a message turns up. The fact that all objects in such a formal system are actors means that the messages themselves are actors.

HOARE . . . Drifting away from programming languages.

Generally speaking, the list of actors acquainted with any one actor is limited, which helps to partition the design of the system so that what is asynchronous cannot produce rubbish results, which is one of the larger design problems in parallel machines.

The behaviour of actors is strictly specified by the script and between being called upon their existence is controlled by their memory. All executing and communicating objects are actors in the formal structure of such a system which arose out of work at the Massachusetts Institute of Technology in artificial intelligence.

The point about the MIT model was that it was intended to be a formal model of computing, not to work as a programming system. One of the results of experimental work at IBM's Yorktown Heights Research Laboratory is to show how the actor model can be used as a programming system, using PL/I as a programming language.

The IBM version of the actor system moves away from absolutely everything being an actor to the restriction that objects implementing an application are actors.

The idea is that users can directly program the actors working in an application and so the actors are "large" in comparison with the original intentions of the MIT approach.

This neatly illustrates the almost horrendous spread of concerns about parallelism, because for studies of very high powered and tightly linked bunches of processors, the program elements must function at a minutely described level.

On the other hand, for devising many practical systems for both the office and the factory, the degree of asynchronous working effects rather large scale functions, these being related to a local work centre control, either of document flow, or of an assignment within a manufacturing schedule.

In this latter type of actor programming, the way that synchronisation is controlled among basically asynchronous pieces of program is a basic design step in the transfer of a modelling approach into a full blown programming system.

The IBM office system researchers tackled synchronisation at three levels. The first simply marks some actors as "serial" so putting the work they have to do in a queue. This makes sure that things are done in order.

The second level is controlled by a client actor which keeps track of multiple activities spun off from its needs and makes sure that all these loose ends are neatly tied up before any message is sent on as an indication of its needs being satisfied.

The third level seems to use slightly confusing terminology in that "activities" achieve synchronisation.

This third level of controlling parallelism allows the creation of what appear to be hierarchies of clients, but it also allows the creation of alternatives in activities so that the winning activity can cancel the losing activity.

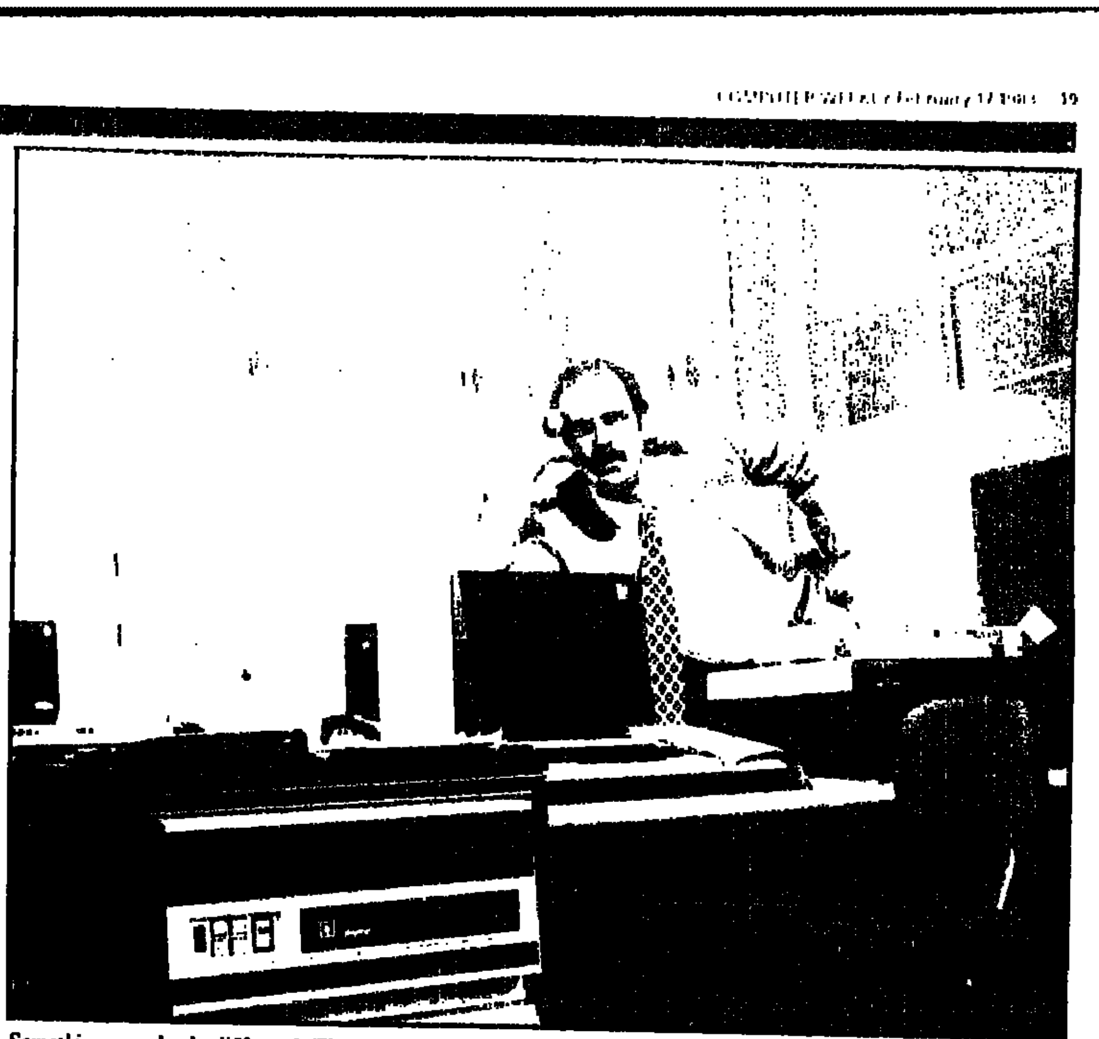
There is also the ability to view an activity as a parent which stimulates the creation of children. All of these sub-activities have to be completed before its main task can result in a message transmission.

Without going into excessive detail, the sweep of the IBM experimental use of the actor conventions can still be seen as very useful for both office automation and factory automation systems building. The system used in this way, as a complete programming system, is inherently distributed and it is almost the reverse of the classic database approach where a raft of passive data structures lies around for operation on by control structures which may fit the application in mind rather poorly – frequent cause of failure in conventionally designed distributed systems.

The whole approach forces the problem of an application to be pieced together as a collection of actors, whose interfaces must be well defined, but whose most notable characteristic is their tendency to be active.

In one of the studies developed by IBM the "windows" of a multiple sectioned terminal screen are all active at any one time. This is a strong contrast to the Xerox Palo Alto Centre's work in Smalltalk where there are multiple windows but a focus, at any one moment, on only one active window.

The IBM approach enables windows to initiate office applications, manipulate images belonging to the applications and scroll over the images, simply in response to user commands. The whole exercise was aimed at taking the System for Business Automation project headed by Moshe Zloof into a screen executed form distributed over many desks.



Something completely different? There is an obvious connection between parallel design of dataflow machines and theatrical conventions.

By borrowing Carl Hewitt from MIT, who developed the Omega network system for knowledge engineering, the IBM staff were able to implement this system and use it to provide a relational access method to support the general shape of Zloof's work – which is best known from the original Query-by-Example method, now established as an IBM product.

The essential point that has been seized by the IBM research staff in experimenting with the "actor" formal notations and pushing them into a working system via a subset of PL/1, is that distributed programs have to be concurrent ones.

However, most of the concurrent programming languages show that they are excessively influenced by the expected shapes of the architecture that they are to run on. In Britain, the Inmos based development of the Occam language seems to follow in this stream, although there seems nothing to stop it implementing "actor" type ideas.

The IBM staff have started at the opposite end by fixing on a description process which helps to focus on the expected behaviour of the system.

The great British contribution to parallel computing, is naturally Hoare's Communicating Sequential Processes, which like Carl Hewitt's "actors" drifts away from programming languages and heads in the direction of modelling the process of computing.

However, the modelling of some general system is viewed by Tony Hoare's method as essentially one where synchronisation is part of the modelling act itself. For an evolving office or factory system this seems to suppose that the job of co-ordinating the computing can be envisaged before many of the pieces of computation have been described in behavioural terms.

To say the least, this seems unlikely.

To date the buzzword "distributed" has mostly been applied to data, rather than to any processing of data, signals or text. Simply to save confusion it might be best if parallel and distributed processing became labelled as "co-ordinated computing" systems.

However, despite buzzword proliferation, or perhaps because of it, we shall need to find more ways of describing the behaviour of genuinely distributed processing, and also to find implementation and programming methods at least as good as the ones attempted by the team involved in the System for Business Automation project led by the redoubtable Zloof.

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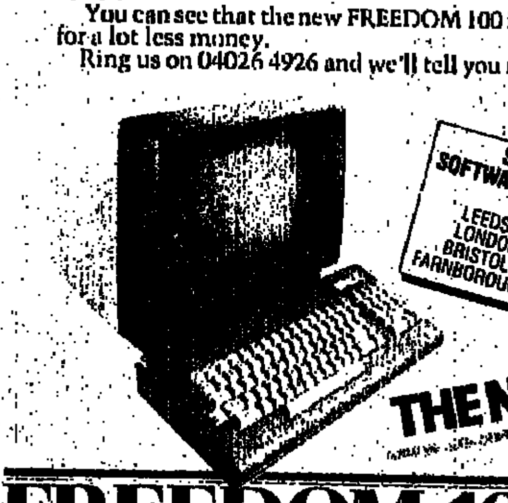


STAFF SPECIALISATION

The distribution of essential skills among professional computer staff is changing . . . Don Hazel reports

Computer job skills growing faster than the technology itself

IN the beginning of business computing there were no operators, programmers, analysts or hardware/software specialists – only computer people. They were all things, and because of scale, were able to keep abreast of all aspects of the subject.

Today they are able to keep abreast of some, but not all, of the facets of their chosen career – a situation common to many professions.

The days are long gone when all things were in one head. An over simplification of the statement of the present situation might be, "All computer people need to know something about everything – some need to know everything about something".

With rapid computer systems development has come a confusion about defining functional responsibility and who should shoulder it. Executives who have concern for cost effectiveness and, hence, prosperity of business tend to question the proliferation of computer staff. They need to be made aware of the growing specialisation in the modern computer department.

The skills needed to provide an effective computer service expand at a rate determined by the growth rate of the use of technology. This is faster than the growth of the technology itself.

The halcyon days of a single program computer processor with single peripheral input and a single output device have quickly made way for multiple configurations with every conceivable facility and access availability. The skills requirements of the people has grown accordingly and this must be recognised by those inside and outside the profession.

In modern business fundamental computer knowledge is required by management if it is to take full advantage of modern technology. This minimum level is essential if management is to initiate business innovation and communicate its needs to those responsible for detailed computer activity.

This "fundamental knowledge" required is probably confined to an understanding of simple computers, stored program techniques, input and output devices and secondary storage methods. Some will have the ability to create simple programs in one of the high level languages available for elementary applications, eg. Basic.

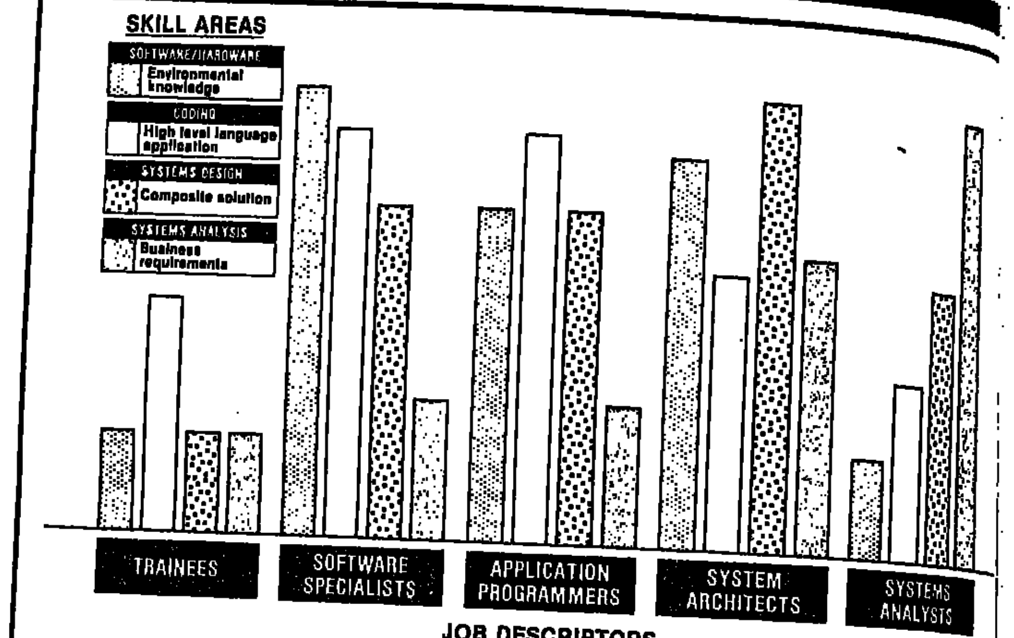


Fig 1 reflects a comparative skill expectation for a range of computer people found typically in the system development area of the management services function.

The following definitions are not exhaustive, but refer to skills that must be present in professional computer staff to provide an effective service.

The skills identified as necessary to create efficient programs written in a high level language for complex business applications include the ability to write programs which will be complementary to the modern-day business situation, reflect the way in which workers perform their jobs (eg online order processing, transaction processing); make use of dialogue computer language; communications facilities; on- and offline storage as appropriate; complex peripherals, and take due cognisance of back-up, fall back, restart facilities, and of general security requirements.

Although there is much common technology shared by the manufacturers, the semantics vary, making each appear to be providing his own particular brand. This will lead to a further level of specialisation where experience of a particular manufacturer's products predominates.

The requirement is for knowledge of equipment components and interfaces, firmware, operating systems and data communication systems.

Also desirable is a knowledge of compatibility for a pertinent mix of business systems, assessment of interworking between mixed manufacture hardware and software, and low level language programming.

As for systems analysis, the important skills required to perform this function have been evaluated by Dr Robert Alloway of the Massachusetts Institute of Technology. He ranks them in the following order:

1)Strong user orientation, delivering systems users like.
2)Ability to work with ill-defined objectives and resolve conflict productively.
3)Skills in organisational design and assessing system impacts on user departments.
4)Behavioural sensitivity to impacts of systems on individuals.
5)Project management skills (planning and control).
6)Broad view of company goals and operations, senior management orientation.
7)In-depth knowledge of user departments' operations.
8)Dedication, hard work, hustle.
9)Implementation planning, education, motivation and training of users.
10)Leadership ability, administrative experience, political sensitivity.
11)Ability to work intimately with senior user managers.
12)Estimating and rigid adherence to project costs and schedules.

Where advanced computer applications form a significant part of the system, the skills required include a thorough understanding of all its proposed features and the ability to prototype from proposals, as well as the ability to produce accurate models using simulation techniques.

The ability to communicate detailed specifications to user management should not be underestimated, in addition to the ability to produce specification for the work of coding staff and other specialists.

Computer staff require a thorough understanding of many component skills if they are to co-exist effectively with their fellow users.

The histograms (Fig. 1) reflect a comparative skill expectation for a range of computer people found typically in the systems development area of the management services function. (Fictitious job titles have been used so that there is no confusion with existing nomenclatures. They have been chosen, however, to reflect the individuals' main occupational skills.)

There has long been confusion in the definition of the precise nature of the duties of each, for example, with systems analysts and systems architects. Expressed as in Fig. 1 the predominant skill requirements are significantly diverse as to make any confusion in their employment quite impossible. However, most systems analysts would claim to be both analyst and architect. Certainly this should not be the case in organisations employing modern techniques.

For additional clarification, the "trainee" has been included in Fig. 1. The Littlewoods Organisation has been used as an example, since it has a formal training scheme requiring the new entrant to carry out programming duties.

Following 20 weeks initial training the trainee is required to get a grounding in application programming for about two years. After this time he is expected to specialise in specific disciplines.

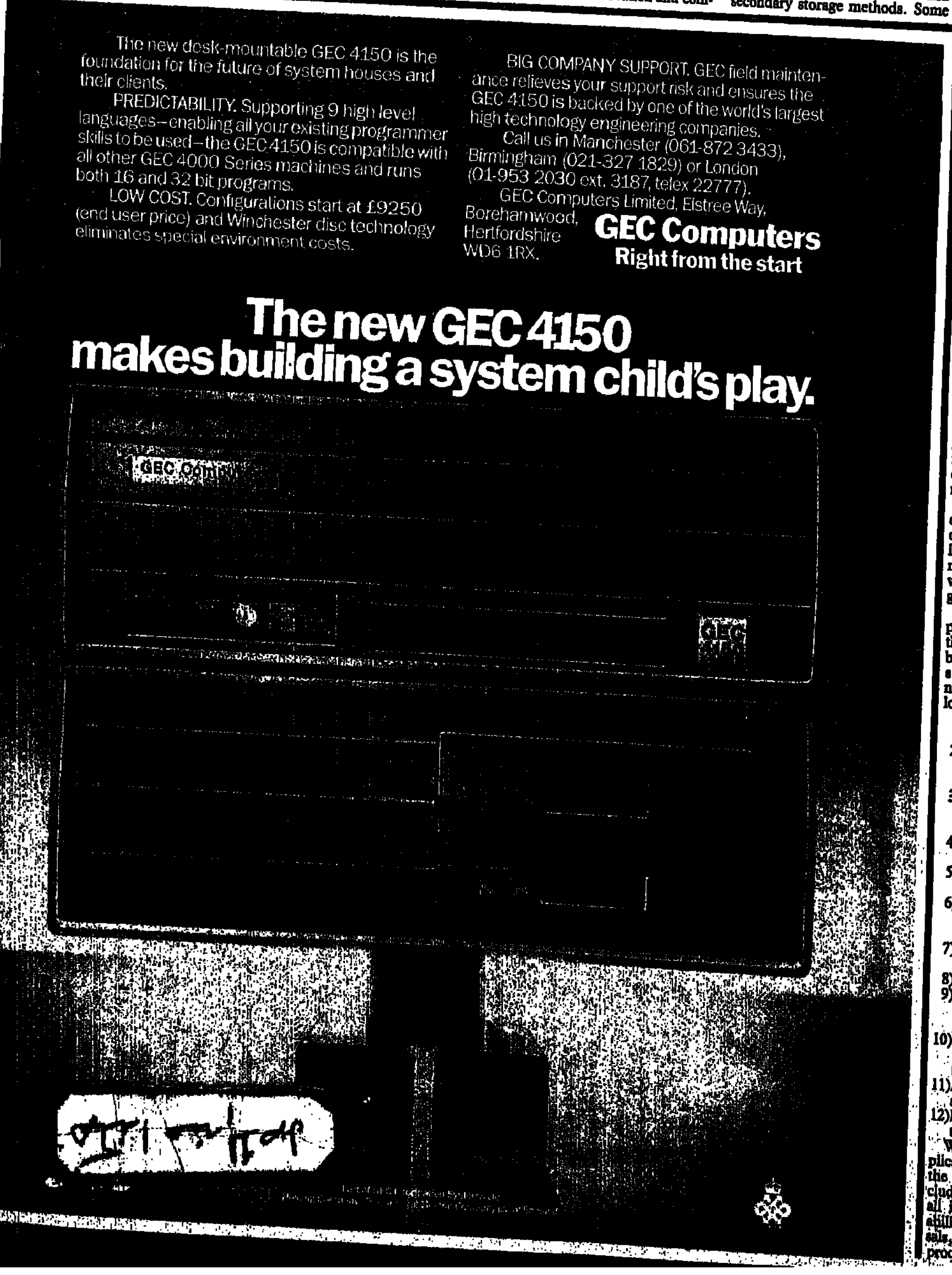
An appropriate job description highlighting the mix and relevant skill levels required for a systems analyst might include a specialised in-depth knowledge of systems analysis techniques, a thorough understanding of systems design techniques, previous experience of commercial standards in high level language coding practices, and a working knowledge of software/hardware environment skills.

An improvement in productivity, morale and, hence cost effectiveness could result if a reappraisal of the job specification, and of the individuals filling jobs, were initiated.

In the past, there have been definite tendencies to further exacerbate the situation by confusing market availability (or scarcity), technical skills and management ability, in order to follow practices probably more suited to other functions of parent organisations. Many readers will be aware of job evaluation routines being applied universally to large organisations.

While computer staff remain in short supply and their utilisation is strongly identified with the very survival of business, their administration should be clearly defined, as simply and as effectively as possible.

Don Hazel is senior principal consultant at [illegible] Software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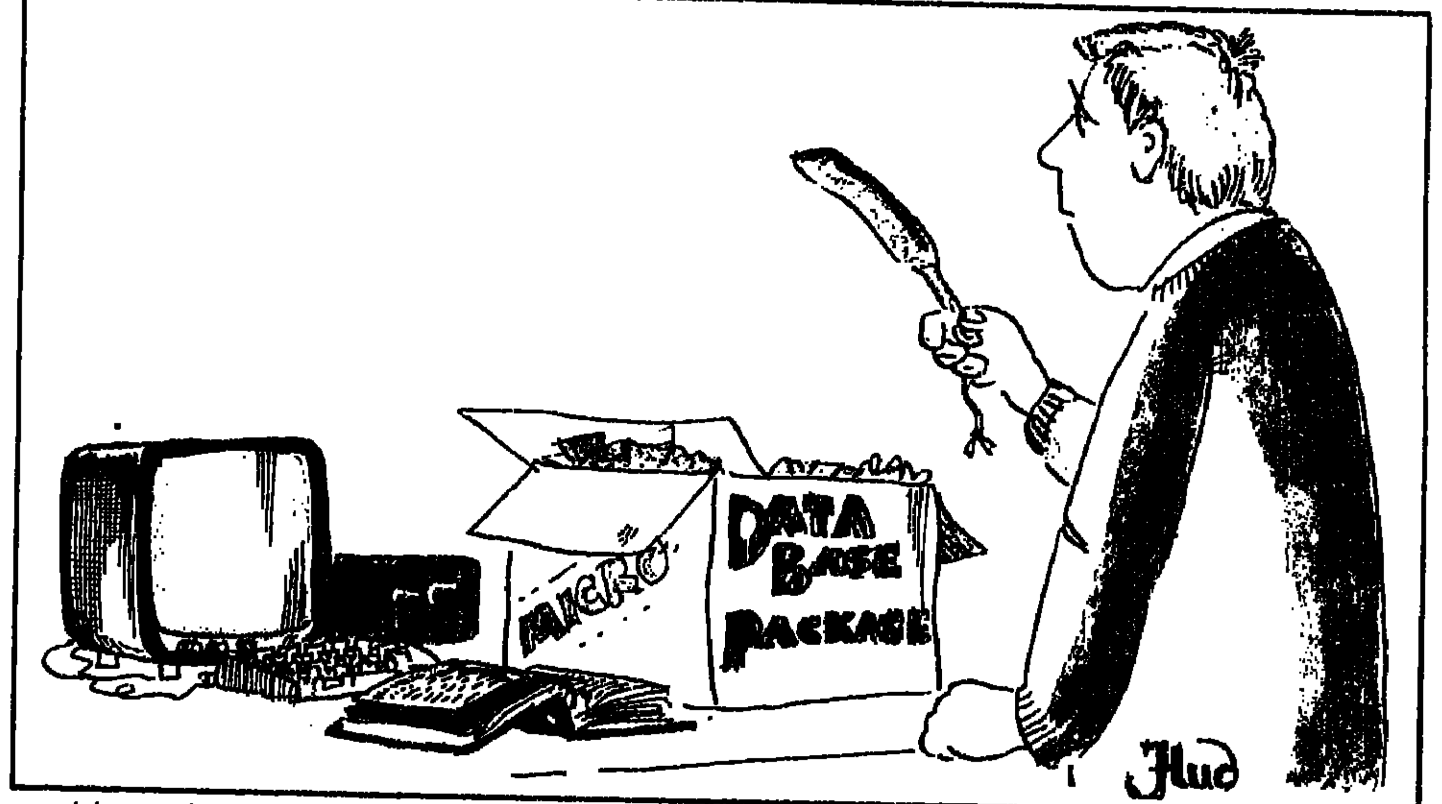
DATABASE FOR MICROS

Relational database is difficult to implement on micros, despite software vendors' claims, argues Phil Manchester

A way out of problems of file handling on a micro



ONE of the first things that strikes a mainframe or mini programmer moving "down" to microcomputers is the parlous state of the file handling software.

As most micros are programmed in the Basic language, itself never designed for handling files of data, it is no surprise that facilities are to say the least, primitive.

But times are changing and a number of companies are offering file handling packages appropriate to commercial use, and some are even more ambitious in offering database management software.

In most cases, it is perhaps an overstatement to call these packages database management products, but they do offer a way out of the problems inherent in file handling on a micro.

The range of products on offer currently would seem to meet every possible need for micro users. At the top end there are products like dBase II, developed by the US software company Ashton Tate. Selling for about £450 through various UK agents, the package is billed as a relational database management system. This is an example of the type of overstatement of which micro software builders are very fond. Certainly, the package does offer some relational type techniques, but it is stretching the concept of relational database a bit too far to call the product "relational".

By way of contrast, IBM's System R has been in the experimental stage for some years, and IBM is still not satisfied with its performance on a giant mainframe to offer it as a product.

Do not be deceived by the marketing statements of software companies – relational database is extremely difficult to implement in its entirety.

Despite this, dBase II has gained a reasonable reputation among its users, although the general opinion suggests it is not a system for the inexperienced.

The same can be said for FMS 80, a product in the same price range (£640). Again developed by a US company, FMS 80 offers the same sort of range of facilities one would expect with packages for larger machines. Running under CP/M, the system also offers facilities for working under a menu selection and editing regime.

Here again, the system is recommended for experienced computer users rather than novices.

Still in the upper end of the market is another "relational" product called Condor. Developed by Condor Computer Corp, the product is sold in the UK by MOM Systems of Gravesend.

Prices start at £195 for the basic file handling system rising to £650 for the full system including multiple file handling, a report writer and indexing.

Again the system runs under CP/M on 8-bit machines with a 16-bit version for the IBM Personal Computer about to be launched.

Moving down the range, Compsoft's DMS comes in two forms – a version specially built for the Pet and another which is CP/M compatible. There is a marked difference in price with the CP/M version of the product costing £400 and the Pet version less than half. It is, however, a UK developed product.

DMS and most other products at this price range operate only on a single file which makes them more properly file management systems rather than true database systems. FMS 80, for example, will allow simultaneous processing of up to 19 files and Condor and dBase II will take two files apiece.

At the lower end prices top at around £150. This is about the lowest you would pay for a reasonable product despite the fact that in the US you can get a "database manager" for as little as $25.

Two UK products fall in the £150 range with *Microtrend's* Trendisk marginally cheaper than Caxton's Cardbox at £155. To promote sales of the latter, Caxton has started to distribute a read only version for nothing.

Both of these systems offer facilities to handle free text. In other words they can be interfaced to a word processing system and indexes may be built up for free text files. This is the type of facility that should prove very useful to microcomputer users wishing to use their machines for a variety of tasks embracing word processing and general business systems. Both systems run under CP/M.

All of these systems will require around 48K RAM or more (the Pet version of DMS will run on a 32K machine) and will probably require substantial disc storage to hold the software. DMS uses 280K of disc storage to hold the software. DMS uses 280K of disc, according to the developer, while some of the larger systems require even more.

It does depend largely on who is going to be using the system which product best meets the need.

Cardbox and *Microtrend*, for example, are aimed very much at the novice user rather than the programming aficionado. But this means that they are limited in their range of facilities. On the other hand the more expensive systems offer more facilities but are not as accessible to the user as they might be.

> **‘In the end the measure of a good database package is the quality of its various interfaces – the interface between the package and the user, between the package and programs and for the sake of efficiency between the package and the physical file system’**

They may well offer what is called an "English like" language with which to communicate with the DBMS. This is a little like an estate agent describing a property as having "considerable potential". In other words, it is pretty meaningless and buyers should be cautious.

The product may well offer a "language" to aid processing which will be a lot easier to handle than Basic or one of the micro assembler languages. But "natural language" interfaces are a long way from reality as any researcher in the subject using enormous mainframe resources well knows.

After all, if it had been possible to manipulate computers with "real" language, then things like Cobol and Basic would have been unnecessary in the first place.

A good guide to the strength or weakness of the claims for a natural language interface is the size of the accompanying manual. If the manual is very thick, as tends to be the case, then it is not likely to be a candidate for a natural language interface. If it were that good, you would not need a manual in the first place!

In the end the measure of a good database package is the quality of its various interfaces – the interface between the package and the user, between the package and programs and for the sake of efficiency between the package and the physical file system.

As well as control languages for manipulating the database utilities, the package should offer good quality facilities for specifying the structure of the database. Where structured data is to be used – that is, in most business applications – a straightforward method of specifying fields and file content is essential.

In larger database systems, a technique called the data dictionary is employed. This enables the user to specify detailed information about fields and files (and sometimes even programs). *More* important, it allows changes to be made without affecting the data itself. In other words, if you make a change to a couple of fields in your database, it should not be necessary to re-enter the data in the new format; the package should be able to perform the reformatting for you.

In the less expensive packages these sort of facilities will not be available, but even here a simple utility should be included. In the sort of applications that micros are being used for, an interface to free-text files is a valuable asset and most of the database packages around are offering this now. Both Cardbox and Trendisk have been designed to meet this particular need as a high priority.

This means that the database management software can be used to juggle around with files produced by word processing systems. So, if you wanted to pull out all references in a document to a specific item, the database package will provide an index to do just this.

As far as the efficiency of the interface with the physical machine is concerned, there is a greater need for this on microcomputer systems than other systems because of the limited storage available and the slow speed of the peripherals attached for storing the data (floppy discs or if you are lucky and rich, Winchesters).

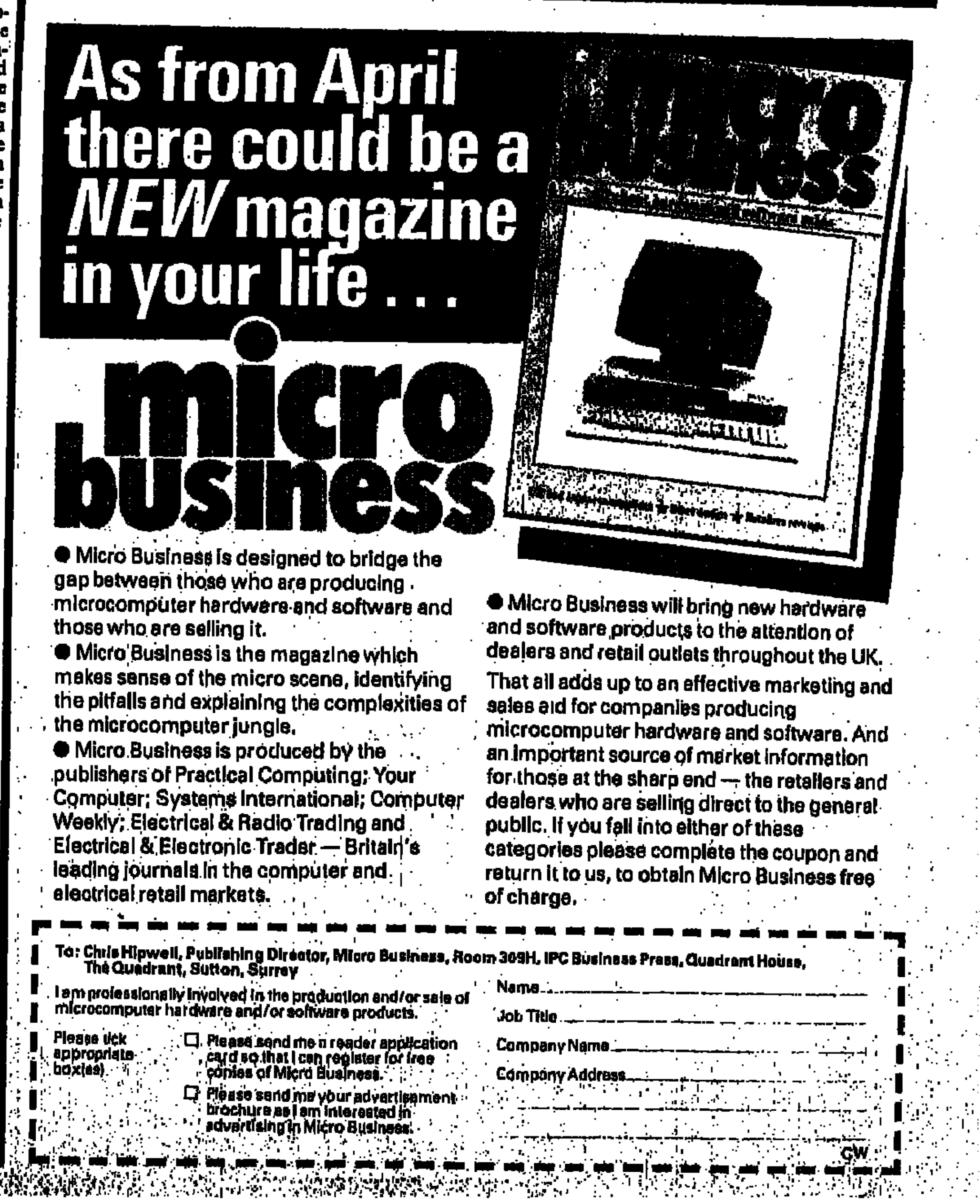
Unfortunately the same criteria apply to building this sort of low level software on micros as once applied to larger machines. For a database management package to be of use, it must be able to perform. The only way of testing this is to try it out.

Another important aspect of all database packages is their ability to recover from disasters. There is nothing more frustrating than spending a day entering data into a file and then have it crash. On larger machine systems, sophisticated recovery options have been developed to get round this sort of problem. On micros it is probably even more critical. Large machines are seldom turned off in the middle of an update and large expensive disc drives are much more reliable than the low cost floppies found on micros.

Cardbox, for example, is claimed to be able to recover from even the most traumatic systems crashes with specially built "salvage" routines. This is a feature which does not appear to be available with some of the more expensive packages.

In conclusion, it should be remembered by any prospective purchaser of a database package that it is no easy ride. Professional programmers and systems analysts have been struggling for years to get database right on bigger machines. They have succeeded in getting some of the simpler aspects of database management to work but the more ambitious concepts of an integrated centralised database of all the data required for a company's systems have yet to be realised. For straightforward applications – say a general purpose customer file – such packages can be a real boon. They take a lot of the heartache out of file management. Even here, however, the person charged with implementing such a system will need to know a fair amount about data design and programming to make a success of it.

The golden rule as always with software packages, is to give the software a jolly good work out and insist on getting your hands on it before signing on the dotted line.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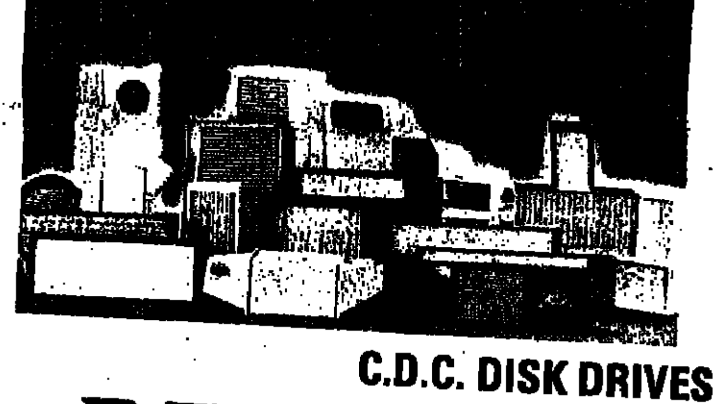

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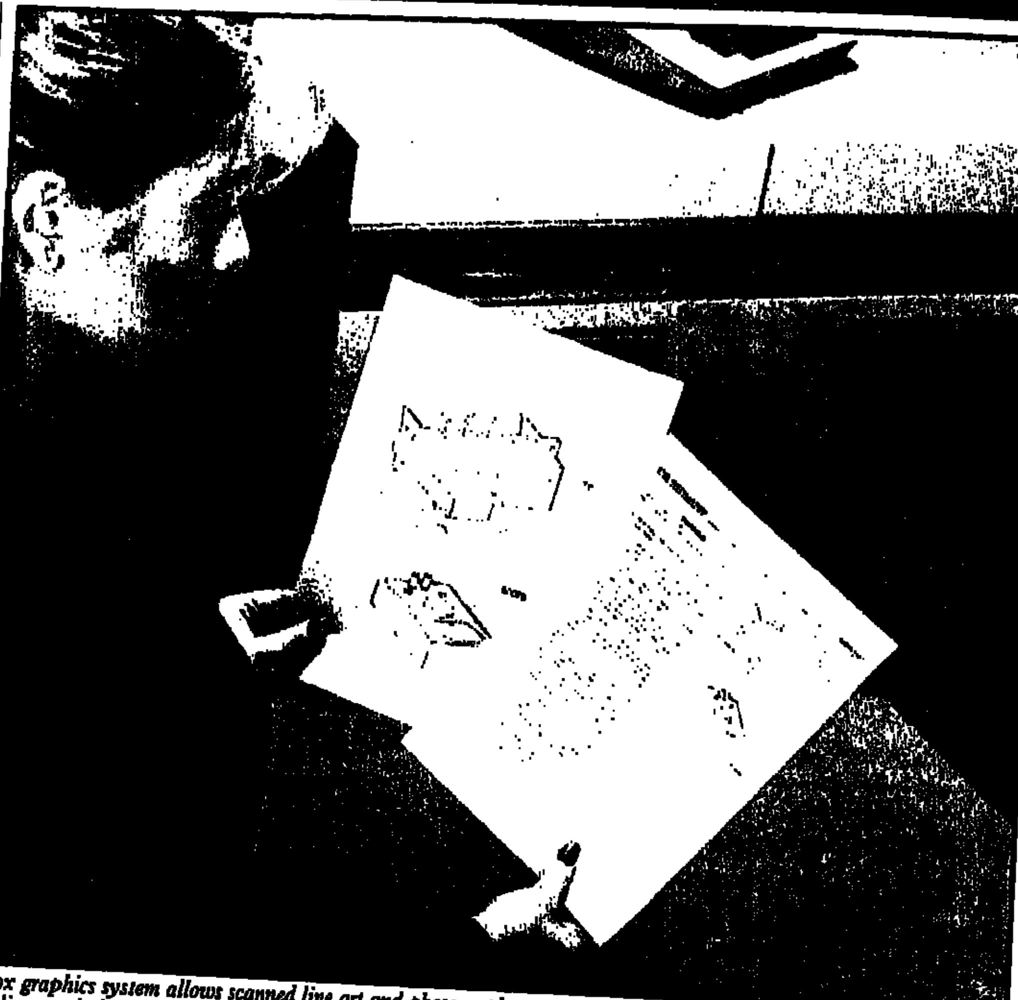
These drives also incorporate other features of the R0200 series such as two chamber construction, thermal compensation and special airflow.

The R0206 and 208 are dimensionally compatible with the majority of 5¼-inch floppy disc drives, measuring 8 inches by 5.57 by 3.25 inches.

The rotary head positioner, which minimises head yaw so improving head flying stability, is driven by a rotary stepper motor controlled by a digital ramp-up, ramp-down velocity profile. In addition, a velocity sensor is used to provide feedback for improvement in hard settling time. The linkage is a band mechanism in a sealed filtered compartment which is maintained at the same temperature as the head/disc enclosure.

Independent Computer Engineering (CW), 16/18 Littleton Road, Ashford, Middlesex. Tel: (07842) 47271/47171.



Xerox graphics system allows scanned line art and photographs or computer generated graphics to be merged with text for direct printing on the Xerox 8700 or 9700.

Xerox bid to transform publishing

THE publishing industry will be totally transformed with the increased use of electronic publishing systems, believes Rank Xerox, which has announced a new graphics system and two electronic printing systems.

Don Wilson, managing director of Rank Xerox (UK), said that with electronic publishing "all the manual intensive processes of the conventional technical publications production method are eliminated".

The graphics system comprises a Xerox 150 moderate speed scanner which merges scanned line artwork and photographs with text, and a graphics handling option and associated software. The graphics and text can then be printed on a high speed Xerox 9700 or the newly announced 8700 electronic printing systems.

The 8700, also announced last week, is a medium speed printing system controlled by its own processor and operating system software, with two 25 Mbyte fixed disc drives. It prints up to 70 pages a minute with a print resolution of 90,000 dots to the square inch.

The third system is the Xerox 2700 distributed electronic printing system, claimed by the company to be the first directly supported, non captive laser printer in the European DP market. It is compact, occupying one square metre of floor space, and prints at 12 pages per minute.

Rank Xerox (CW), Bridge House, Oxford Road, Uxbridge UB8 1HS, Middx. Tel: Uxbridge 51133.

Graphics tablet for HP micros

A NEW graphics tablet is avai from Rapid Recall which graphics to be created very qui on Hewlett-Packard Series microcomputer systems. Kn as the 9111A, the device will sketches, maps, schematic di grams, etc, to be drawn on tablet and simultaneously inpu the computer as a series of di tised xy co-ordinates for presen tion on a display screen or print on a plotter.

The 9111A has an active digi ing area of 218.5 by 300.8 with 16 soft menu keys and lightweight stylus with posi tactile feedback. The soft keys located across the top of the table

Each key will transmit number of the menu key to computer when the stylus pressed on it and the system ware can use this input in the same way as a keyboard inp when a menu is displayed on screen.

Two modes of operation available on the 9111A, sin point or continuous sample. In single point mode a digitised xy ordinate is output to the host co puter each time the stylus pressed on the active surface. In the continuous sample mode tablet can be set to output sty position at a rate between one 60 times a second.

Rapid Recall (CW), Rapid House, Denmark Street, Hig Wycombe, Bucks. Tel: (04 26271.

Protecting floppy discs against fire and theft

VITAL computer records are protected from fire damage by four new storage cabinets introduced by E A Rosengrens of Gothenburg, Sweden.

The new cabinets, designated DC-10, DC-20, DC-40 and DC-60, cater for all forms of computer records, in installations from minicomputers through to mainframes. Interior fittings, all of which can be easily adjusted without tools, range from tape racks for tape reels and cartridges, hanger bars for tape seals, door holders for reels, seals and cartridges, extending and fixed shelves for discpacks, and lockable compartments for secret data. There are also wire baskets for 5¼-inch or eight inch floppy discs.

Cabinet design combines fire resistance with protection against physical damage – sufficient to withstand dropping several storeys – and prevention of unauthorised access or theft.

Rosengrens Security Services (CW), Livingstone House, Carteret Street, London SW1H 9DR. Tel: 01-222 4426.

DC-10 cabinet after testing.

Security system is programmable

A FULLY programmable security system, designed to offer alarm monitoring, CCTV surveillance, and access control for up to 3,000 card holders, has been launched by Cardkey Systems of Reading.

Called the D-1500, the system has been developed for the small to medium business, and allows controlled entry/exit privileges to any designated room, area or location.

At the same time, the system will also monitor alarms for potential hazards or emergency situations like burglary, smoke, and fire.

The Cardkey D-1500 consists of a central controller – a visual display terminal for use at entry or exit points. A CCTV system and an optional printer are available.

When an alarm is activated, an audible warning sounds at the console. The screen then displays the alarm source.

Cardkey Systems (CW), 23 Stadium Way, Reading, Berks RG3 6ER. Tel: (0734) 415211.

Visionhire in Sony deal

UNDER a new agreement between Visionhire Communications and Sony (UK), Visionhire has become a major distributor backed by national service support for the Sony range of business viewdata terminals.

Visionhire has already taken delivery of a large consignment of Sony KTX 9000 nine-inch colour terminals.

It includes an alphanumeric keyboard, 14 page memory, 10 page rapid access and facilities for offline editing with tape recording and automatic "carousel" of stored pages.

Visionhire Communications, Videotex Division (CW), Visionhire House, Station Way, Crawley, West Sussex.

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The Constabulary is investigating changes to its current data network. Proposals are invited from firms capable of supplying full X.25 PSN equipment up to level 3. The equipment required will consist of packet switch exchanges, P.A.D.s for asynchronous terminals and modems for the H.D.L.C. lines using British Telecom leased circuits.
Full details of the required network, including necessary operating characteristics, will be forwarded to suppliers upon application. Responses by the 25th February, 1983.
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Aughton offers industrial robot range for hire

IN WHAT is believed to be a new development in the instrument hire business, Aughton Microsystems of Kirby is offering on hire a range of robots and automated work cells designed for industry and research.

Manufactured by Systems Control of Thornaby, Cleveland, the equipment available comprises the Smart-Arms range of robots and Smart-Cell unit work cells.

Smart-Arms robots are supplied in three sizes, with reaches and lifts ranging from 450mm and 1kg to 1000mm and 1.5kg. Designed for continuous duty, each unit has six articulations: Rotate, shoulder, arm, hand, wrist and position-controlled gripper (where electro-servo systems are used).

The robots are available with a variety of gripper systems. The industrial units are normally supplied with an electric gripper with the end effector configured as hand-wrist gripper but which can be easily changed by the user to hand-yaw gripper. Pneumatic grippers, in any configuration, can be fitted to the industrial range. Research robots are usually equipped with the gripper in the wrist-hand gripper arrangement.

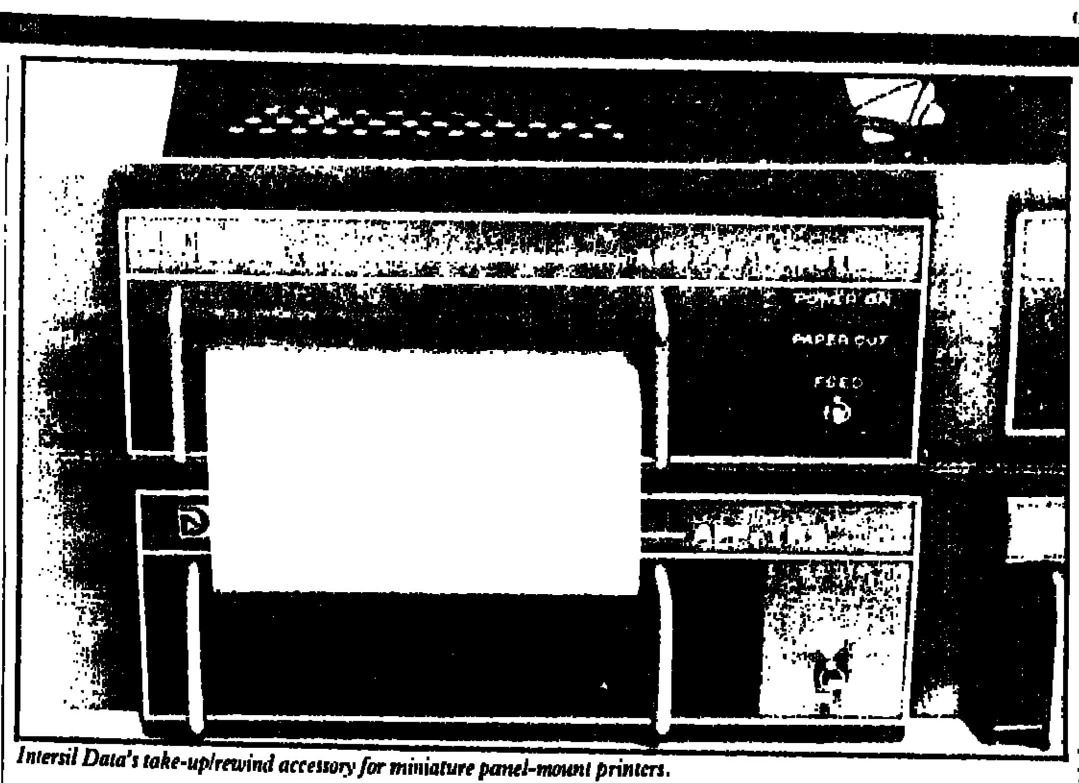
Smart-Arms industrial and research robots (Types I and R) are computer controlled. The industrial version has the computer built into the electronics cabinet whereas the research robot's computer is separate to facilitate access to software.

The software supplied with Smart-Arms enables the user to program the robot to perform a wide range of tasks which can interact with external processes. The movements are programmed by means of the Smart-Arms control keyboard or computer keyboard.

The Smart-Cell is an automated work cell capable of standing alone as a production or research unit or it can be linked to other machines by means of a supervisory computer.

A Smart-Cell 8T system comprises a Smart-Arms 61/600 robot rigidly linked to a two-axis work table, an interface electronic control unit and an Acorn Atom single board computer with operating software held in ROM and display monitor.

Aughton Microsystems (CW), Woodward Road, Kirby Industrial Estate, Kirby, Liverpool L33 7UZ. Tel: (051) 548 6060.



Intersil Data's take-up/rewind accessory for miniature panel-mount printers.

Accessories for Intersil printers

INTERSIL Datel has added three new printout take-up/rewind devices to its line of thermal printer accessories.

These devices, the APP-TR1, APP-TR2 and APP-TR5 have been designed to be used with the company's DPPQ7, APP20 and APP48 panel mounting thermal printers respectively. Each accessory mounts on a single hinge allowing the user easy access to the paper which has been taken up.

Paper is drawn into the unit by a slotted take-up shaft and there is no need for reels or any other type of device for spooling the paper. The new accessories have been designed so that paper which has been taken up may easily be pulled back for viewing without tearing.

After viewing the printout will automatically be drawn back into the unit.

Operating temperature range of all three devices is 0-+50°C. All are +12VDC powered, draw 750mA (max), 9W (max) and have a paper handling capacity of 150 feet or a 2.5 inch diameter roll.

The APP-TR1 accepts paper up to 1.75 inches wide, the APP-TR2 accepts paper up to 2.31 inches wide and the APP-TR5 accepts paper up to five inches wide.

Intersil Data UK (CW), Snamprogetti House, Basing View, Basingstoke, Hants. Tel: (0256) 57361.

Intergraph puts more memory into workstations

GRAPHICS display manufacturer Intergraph has improved response speeds and included new facilities in its latest raster workstations by putting more processing and memory in the terminals.

The new monochrome DSP041 and colour DSP042 have three processors to carry out functions normally left to a host computer.

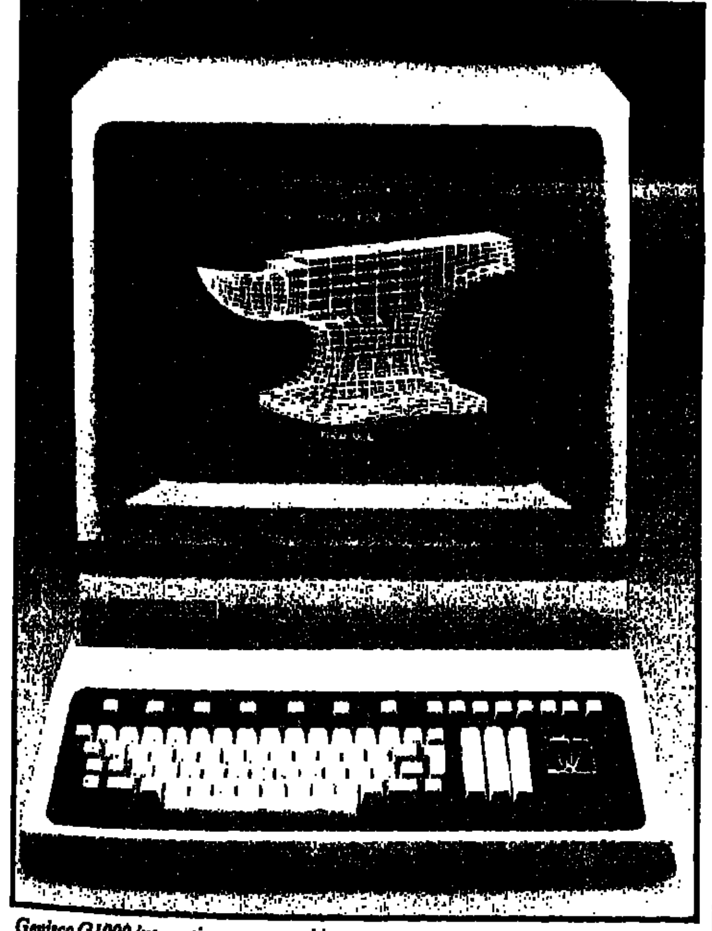
They also have 824K of memory, which means a terminal can hold entire designs. Different views can be retrieved and displayed, again without reference to the host.

New functions built into the terminals include panning over the entire design at any speed, three-dimensional rotation and zooming in on specific areas, all through simple commands.

Both terminals have 19-inch screens which can display eight views of the design. The screens have a resolution of 1,280 picture elements by 1,024.

The DSP042 has 4,096 colours and can display 256 of them at a time.

Intergraph (CW), Albion House, Oxford Street, Newbury, Berks RG13 1JG. Tel: (0635) 49044.



Genisco G1000 interactive raster graphics system.

Low-cost graphics for detailed design work

THE Genisco G1000 is a low-cost, high resolution, interactive raster graphics system, based on the Z-8001 microprocessor. It has been designed for applications such as CAD/CAM, plot previewing, electrical engineering, scientific data analysis, mapping and circuit board design which require precise detail. It costs about £7,000.

Being based on the Z-8001 microprocessor makes it plug-compatible with the Tektronix 4041-1 DVST, allowing it to be up and running on existing software. It is user programmable offering up to 16K words of EPROM as well as 16K RAM.

The G1000 uses rasterscan technology which has the advantage of selective erase of any portion of the graphics or alphanumeric image. High contrast, and brightness, using a black and white screen permits clear viewing in normal light. The terminal gives long product life and continuous viewing can be achieved without damaging the CRT phosphor. The high performance 60Hz refresh ensures flicker free viewing.

Resolution of the G1000 is 1024 x 792 x 1 bit. It has a detachable keyboard with typewriter-style alphanumeric keys, special function keys, a 12-key numeric pad and cursor controls for interactive capability.

The G1000 has a standard asynchronous, serial, full duplex interface that is RS232 compatible.

R & H Systems (CW), Oxford House, Oxford Street, Wellingborough, Northants NN8 4HG. Tel: (0933) 227477.

Monitor protects against early failure

LOST data and garbled information in microprocessor and computer-based equipment are the most obvious signs of mains disturbances. An effective and easy-to-use method of detecting and recording mains disturbances is now provided by the TM-240 mains monitor, a small, lightweight and inexpensive indicator, available from Rhopoint.

Even when damage and data loss effects are not obvious, continued attack by transient noise waveforms can cause cumulative damage to circuits and lead to early failure.

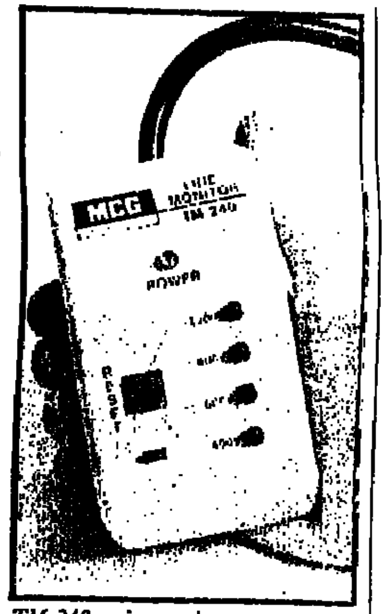
Applications for the TM-240 are many and varied, due to its simple, LED disturbance indication and its straightforward connection across the equipment to be monitored.

The unit can be left unattended to record the disturbance amplitude over a specified time. Used simultaneously throughout a building or factory, a number of TM-240s will provide a profile of the disturbance amplitude at different locations, as well as providing profiles of these disturbances against time.

Prior to installing new equipment, the TM-240 can be employed to analyse the condition of the power outlet which will be used, to determine if corrective action is required. Once the new equipment is installed, the monitor will indicate if any new disturbances are present on the mains supply.

If mains protection equipment is fitted, then the TM-240 will be useful in monitoring its performance.

The TM-240 has a response time of less than half-microsecond.



TM-240 mains monitor.

Rhopoint (CW), Eastman House, 98-102 Station Road East, Oxted, Surrey RH8 0AY. Tel: (08833) 7988.

New concept in portable terminals

THE Codestar from S.B. Electronic Systems is a new concept in portable data capture terminals, says the company. It is a tough-cased barcode reading and storage unit with powerful software features for formatting, validation and editing. The barcode reading tip is integrated into the body of the unit instead of being in a separate pen.

It is designed for applications where the prime data capture requirement is from barcodes. Ergonomic features include lightweight case, flash and bleep on code reading, earpiece extension for noisy environments, "line of sight" display and indicator lights, and angled nose for easy scanning.

Electronically the unit is compact, using the powerful Intel 8751 processor to reduce the chip count dramatically. Up to 48K of memory can be configured allowing about 90,000 numbers to be stored, depending on the format.

Software includes dual format barcode reading if required with a choice of most popular symbologies including: 2 of 5 Interleaved, Plessey/MSI, Codabar, Code 39 and Telepen full Ascii code.

The Telepen Ascii code is the basic "operating system" barcode used for software changes to field formats, data transmission rates etc. Telepen barcode is now recognised as a standard code for applications where both full alphabetic capability and compact numeric code is a requirement – previously only achieved by using two codes.

Telepen barcode also provides a flexible system for entering variable data. The Codestar has no keyboard, making it resistant to damage and accidental data entry. By using a Teleboard – a flat plastic sheet of pre-printed barcodes – any data may be entered by selecting and scanning the codes. This is analogous to keyboard entry. The Teleboard, however, gives the user and systems designer the ultimate in flexibility of design at low cost and with high ruggedness.

The display is 16 character liquid crystal dot matrix giving fully formed alphanumeric, upper and lower case and symbols.

S.B. Electronic Systems (CW), Arden Grove, Harpenden, Herts AL5 4SL. Tel: (05827) 69991.

Cabinet can store 1,800 pages

A DESK-TOP cabinet which can store 1,800 pages of printout is available from Rexel. The Data Drawers unit measures 18.25 inches by 15.25 by 10. Each of its six drawers can hold 300 pages either loose or bound into the drawer with the threaded posts and nuts supplied.

If sheets are bound in an individual drawer and its contents can be taken to other offices or to meetings using the handle provided.

Smaller Data Drawer units are available for papers of up to foolscap size. And pre-formed tray inserts can be used to take up to 48 tape cassettes, 18 disc cartridges or 48 print wheels.

Rexel (CW), Gatehouse Road, Aylesbury, Bucks HP19 3DT. Tel: (0296) 81421.

BT to set up fraud fighting service

CREDIT card frauds now running at £20 million a year could be cut dramatically with the help of British Telecom's Cardcheck service, due to start in June.

The service will complement a more expensive equivalent launched last year, in which telephones with built-in magnetic card readers and costing about £400 each are linked by telephone directly to the credit card companies' computers.

In the Cardcheck service, simpler telephones will be used to key credit card numbers, expiry dates and transaction amounts into a British Telecom voice response computer at the Cardcheck centre. The computer will forward the details to the appropriate credit card company via BT's Packet Switch Stream data network and translate the reply into a digitally-stored voice message for the retailer.

The lower cost of the Cardcheck telephone will make the service economical for a wider range of retailers who make less frequent contact with credit card companies, says BT.

British Telecom (CW), 2-12 Gresham Street, London EC2V 7AG. Tel: 01-357 3814.

HP 3.5 inch discs in UK

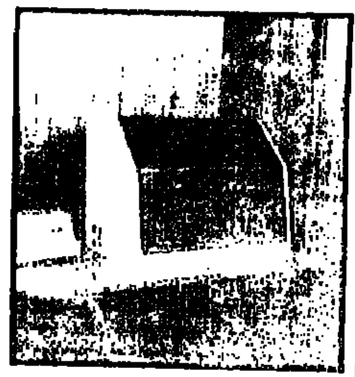
HEWLETT-PACKARD'S 3.5-inch microfloppy disc systems are now available from the UK firm Rapid Recall. The drives are compatible with Hewlett-Packard's Series 80 personal computers.

They use drives from the Japanese manufacturer Sony but Hewlett-Packard makes the control electronics and packaging.

The discs come in a cover with a sliding section which covers the read/write gap to protect it from dirt. This feature is said to be unique.

A new monitoring system keeps track of disc use and advises the user when a disc should be replaced because of its age.

Rapid Recall (CW), Rapid House, Denmark Street, High Wycombe, Bucks. Tel: (0494) 26271.



Ventguard's acoustic cover.

Acoustic covers cut the noise

A RANGE of acoustic covers for word processors has been introduced by Ventguard, which specialises in noise control. These covers are designed to a high specification with great emphasis being paid to the aesthetic appearance, says Ventguard. The comprehensive range ensures that an economic cost is incurred relative to the appropriate printer. For volume orders, a colour range is available, with individual requirements incorporated.

The product should fit well in any office or domestic situation, says Ventguard.

Ventguard (CW), Unit 12, Highview Avenue, Keyworth, Nottinghamshire NG12 5EL. Tel: (06077) 5856.

Managing international operations

THE SCS commercial and financial management system from Shortlands Computer Services incorporates facilities for multi-currency transactions within a wide range of software packages.

The packages, which are fully integrated and upgradable in easy stages include general ledger and budgetary control with report writing facilities; cost ledger; purchase ledger; sales ledger; payroll; labour costing; stock and purchase orders control; customer order processing; works order processing and work in progress.

The system, which runs on the Unix-operated Zilog 8000 family of microcomputers is felt to be a forerunner in its field, and will be useful for firms which operate internationally, says Shortlands.

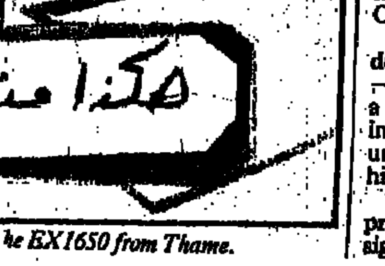
Shortlands Computer Services (CW), Shortlands, London W6 8BT. Tel: 01-741 0130.

Hard copy from video

THAME Systems has introduced the EX1650, supplied by Axiom Corporation for the US.

The printer enables full size hard copy output directly from any video input including video display units, graphics terminals, monitors or even TV sets with high quality 3000 dot resolution. Any displayed data, including complex graphics, alphanumeric data in any size or font, foreign symbols, or even hieroglyphics are quickly reproduced on the printer.

Thame Systems (CW), Thame Park Industrial Estate, Thame, Oxfordshire OX9 3RS. Tel: (084 421) 5471.



he EX1650 from Thame.

Users can add CAD to business system

COUNTING House Computer Systems has announced a major new release of its Integrated Business System IBS.

The IBS release, combined with the company's existing CAD/CAM system ITS, establishes Counting House as a single-source supplier of both CAD/CAM and business systems running under a single computer operating system and aimed directly at the mechanical engineering market.

IBS, like Counting House's Integrated Technical System ITS, runs on Prime computers under the Primos operating system. An ITS user with an entry level Prime 2250, for example, can now run drafting, NC machine tape preparation and business systems on the same computer, with up to seven workstations sited in production and administrative departments. Similarly a user starting with IBS alone can add CAD/CAM facilities to his existing system.

IBS is a modular, interactive, online system. The modules in its two basic application suites, financial accounting and materials control, cover a wide range of functions required by a mechanical engineering company. These include not only sales, purchase and nominal ledgers, management accounting and payroll, but also purchase and sale order processing systems; stock control, bill of materials, and job costing. Further modules, such as process planning and job progressing, are now under development and will be announced shortly.

Other features of IBS include a powerful security system, which restricts access to important data and processing activities to authorised users; and audit trails, which allow transactions to be traced back to original documents when required. Important changes to information on file are also noted for audit. The system continually monitors all processing so that, in the event of a power or hardware failure, recovery can be made with minimal loss of data.

IBS is available as a turnkey system complete with all necessary hardware and software; as software only, to run on an existing Prime computer; or on a time-sharing basis via dial-up lines to Counting House's bureau facility at its Bury St Edmunds headquarters.

Counting House's Integrated Technical System, ITS, gives mechanical engineers an integrated system that takes them from component design through drafting to manufacture, with a recently added option for three dimensional modelling.

It provides a common geometric database which interfaces the output of Counting House's GDS system for mechanical engineering drafting to the GNC Graphical Numerical Control system. ITS also runs on Prime's fully compatible range of minicomputers.

Counting House Computer Systems (CW), Fornham House, Fornham St Martin, Bury St Edmunds, Suffolk. Tel: (0284) 68921.

The adjustable feet of the Adjustaflor system allow perfect levelling on uneven surfaces.

On the level with Adjustaflor

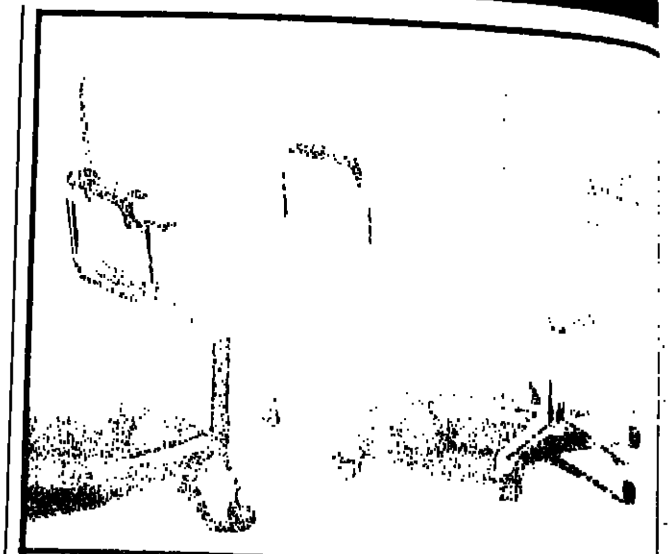
A FLOORING system, designed to meet the need in computer rooms and many offices for raised floors with concealed services beneath, is available from Adjustaflor, a new division of the Sidney Glover group of oil and property companies.

Developed to accept a variety of loadings, with access panels sited wherever necessary, the Adjustaflor system features unique "feet", which can be simply adjusted from above, allowing perfect levelling to be achieved over extremely uneven surfaces. The feet give the added benefit of a low finished floor height, while providing a void of up to 90mm, thus eliminating problems previously encountered in raised floor designs.

Adjustaflor is offered in a choice of materials and thicknesses to suit individual requirements and is available with or without insulation which can save at lease 15% heat lost through the floor. In addition, the system comes in modular form, in 12 panel sizes, and can be rapidly installed by semi-skilled workers on to any hard surface, reducing labour costs and eliminating building material wastage.

This tailor-made flooring package can be supplied to suit a variety of building and structural regulations, says the supplier.

Adjustaflor (CW), Bunny Hall, Moor Road, Bramhope, Leeds LS16 9BT. Tel: (0532) 843344.



The two new chairs in Blue Line's 'Demos' range.

Demos gives the support you need

TWO chairs have been added to the Demos range from Blue Line Office Seating to give computer operators or typists the kind of comfortable support they need when inputting material for data or word processing. As well as height adjustment for the seat, the chairback on the two new models can be moved up or down, and set close to the seat or further back according to the posture required by the sitter.

Model D18 has tubular steel arms topped by broad arm rests, while model D19 is armless. Both are on five-star underframes fitted with sprung spindles. The waterfall front to the Demos seat means pressure is reduced behind the knees – an important feature for those whose work entails extended periods of time at a desk, says Blue Line.

Blue Line Office Seating (CW), 96 Kitchener Road, High Wycombe, Bucks HP11 2SP. Tel: (0494) 20132.

BFI guarantees new disc range for 17 years

A RANGE of 5.2.inch and 8.inch high performance flexible discs, sold with a 17 year warranty has been introduced by BFI Electronics. The discs cost about 45% more than standard types carrying a five-year warranty.

Called the Verbatim Optima Series, the range is designed for use with computer systems handling data of a highly important or even irreplaceable nature. Typically these could include financial records, research data, security sensitive material and other information which needs to be available for both day-to-day access and long-term storage.

The 17-year warranty offered by Verbatim will ensure that each minidisc or diskette is guaranteed to perform an average of 70 million revolutions without the signal deteriorating by more than 25% of its original amplitude.

This performance exceeds the current industry standards by at least 20 times. Each disc is fully inspected and certified 100% error free at and between each track location over the entire recording surface.

The high performance of the Optima Series is achieved by incorporating several innovative developments into each disc construction. A special magnetic coating improves the cohesive binding characteristics of the entire media surface, thus enhancing data transfer and extending disc life, according to the supplier. About 30% more surface lubricant than normal is also applied for greater protection from head abrasion.

The polyester base of the disc is fabricated from specially selected stress-free material, ensuring that surface and track distortion is minimal under varying environmental conditions. This absence of distortion is complemented by a reinforced hub area with improved thermal stability and abrasion protection.

To ensure the lowest wear and longest disc life possible, an exclusive burnishing technique is employed to produce a surface up to 20% smoother than other high quality diskettes.

Optima discs are supplied in specially designed plastic boxes at no extra charge. These interlock to form systematic libraries and filing blocks. The standard of dust-free protection is therefore very high and handling requirements are minimised, says BFI.

BFI, Verbatim's principal UK distributor, expects the Optima Series to prove extremely popular with professional, academic and commercial users.

BFI Electronics (CW), 516 Welton Road, West Molesey, Surrey KT8 0QT. Tel: 01-9

Process control built for quick installation

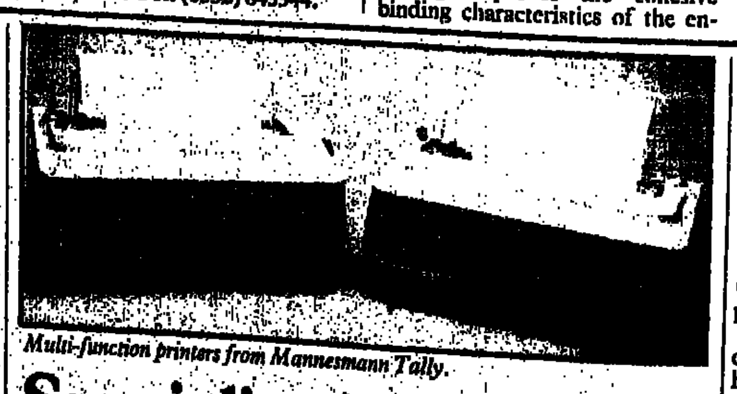
A PROCESS control system which, it is claimed, can be built and implemented in 50-60% of genrally accepted timescales has been introduced by the CRL Systems Division of UK electronic instrumentation manufacturer Control and Readout.

Called CRL 2000, the system is designed for the process engineer – not programmer – to give him a comprehensive range of facilities in a form which he can readily understand and rapidly apply to his process problem areas.

Each CRL 2000 system comprises standard sub-assemblies designed and manufactured by CRL Systems. The built system is, therefore, a single, compact unit which offers simple connections to any plant whatever the process.

Customising the system to the application is the function of the software. CRL is totally programmable on or off site by either CRL's or the user's engineers, with the aid of a detachable keyboard that obviates the need for a separate, costly, programming unit.

CRL Systems Division (CW), Control and Readout, Woods Way, Goring-by-Sea, Worthing, Sussex. Tel: (0903) 504541.



Multi-function printers from Mannesmann Tally.

Specialists' printers

THE MT12X series is the latest addition to Mannesmann Tally's family of matrix printers.

Comprising the MT123, MT125 and MT127, the series offers a compact, cost-effective solution for special multi-function printing applications at up to 160 chps, says Mannesmann Tally.

Mannesmann Tally (CW), Molly Millars Lane, Wokingham, Berks RG11 2QT.

Saving on keystrokes

AN AUTOMATIC log-on routine which can save terminal users over 50 keystrokes has been introduced by Mellordata for its Excel range of Digital Equipment VT100-compatible terminals.

Userlink generates all the initial communications messages from a handful of keystrokes. Mellordata says it is not uncommon for users to have to type 54 characters to log-on to some database systems.

With Userlink the keystrokes are sent at the full transmission speed. This can halve the connect time and substantially reduce user costs, says the company.

Mellordata (CW), Woodgates Road, East Bergholt, Colchester, Essex. Tel: (0206) 298181.

Alternative to software packages

Basic Computer Programs for Business (Vol. 2). Charles D. Sternberg. Hayden/John Wiley & Son. £11.50.

IF you own a small business, have acquired a disc-based microcomputer system with a printer, and are now looking for a source of cheap software, then this book could provide an alternative to the regular software packages that are available on the market.

It contains 70 programs, ranging from customer order processing to personnel record keeping. Each program is well documented with a description of its operation, a listing in Basic, a symbol table, flowchart, and so on.

The programs are of a high standard, with individual processes such as reading records and sorting grouped into separate subroutines. This modular format will enable the reader to modify individual procedures without having to worry about messing up the whole program.

All programs in the book were developed on an Altair 8800.

Unfortunately, there is no proper data validation in these programs, and because the input statement is used throughout, incorrect data entry could produce a system error message, which could be confusing to the inexperienced user.

The programs are of a general nature, so the reader should not buy this book on the assumption that once entered into the computer, everything will be fine. Different businesses have different needs, so some modification to the programs will be inevitable.

Peter Hennersley

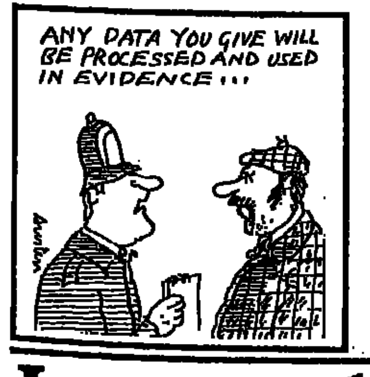
Lecturers make ciphers acceptable

Cipher Systems – the Protection of Communications. Henry Beker & Fred Piper Northwood Books. £14.95.

SELDOM is the reader encouraged to skip difficult or boring sections of a book in order to reach the end, but here the co-authors actually suggest it in their introduction.

They emphasise that the aims of the book are wide: to introduce the subject to students intending to do research into cryptography; those intending to build cryptographic equipment; or those who merely wish to evaluate security products that are available, and that on this basis the background knowledge of readers will be variable, as will their mathematical ability.

A book for such an audience is hard to write, but Beker and Piper have achieved a happy balance which avoids talking down to the mathematician or administering an overdose of formulae to the lay reader.



ANY DATA YOU GIVE WILL BE PROCESSED AND USED IN EVIDENCE...

Each chapter starts by describing either a concept or an encryption device in a self-contained section, so the reader is free to leave the exercises and practical examples and return later, without having missed a vital point.

The authors have made an ambitious attempt to cover both hardware and software encipherment methods including those for voice recognition systems which involve scrambling analogue to digital conversions. By illustrating ways in which a cryptanalyst might intercept and decode a speech message, such as by producing a frame by frame analysis of the amplitude using a sonograph, they suggest more sophisticated methods of securing the data.

Both authors are university lecturers. Piper is professor of mathematics at Westfield College, University of London, and Beker is currently chief mathematician at Racal-Comsec, leading the cryptographic design of all the company's security equipment. Obviously their combined experience of presenting a complex subject in an acceptable way has greatly contributed to readability and impeccable presentation.

MM

Japanese challenge

The Japanese Electronics Challenge. Edited by Mick McLean. Frances Pinter (Publishers). £15.50.

JAPAN and Europe's view of each other in the microelectronics and computing market emerges from this book – and the result is a pessimistic outlook, especially on the Europeans' side.

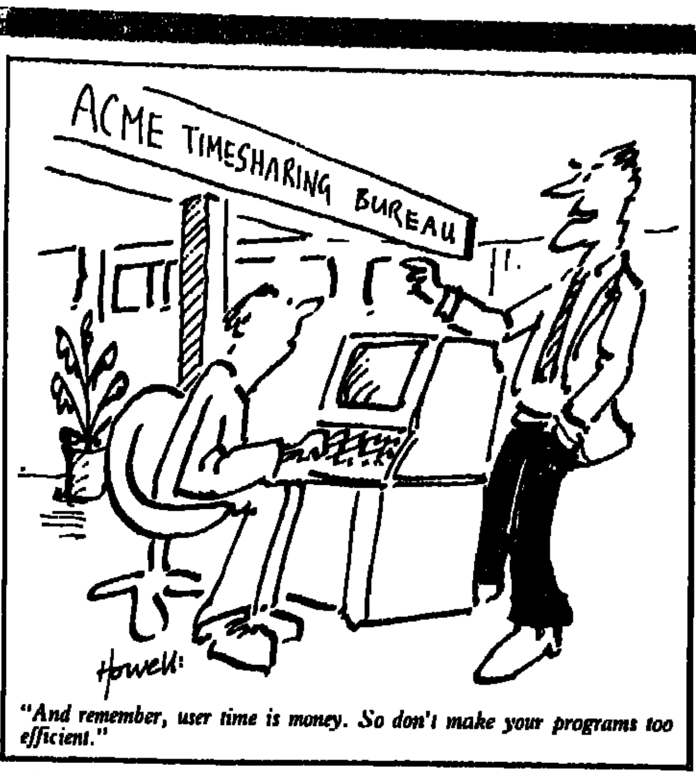
It is a compilation of the views of managing directors and other top people at big companies such as Fujitsu, NEC and Toshiba, Philips, Thomson-CSF and AEG-Telefunken; views presented at two seminars on the problems and opportunities arising from the Japanese challenge.

Papers by European and Japanese business leaders alternate throughout. This emphasises the contrast between the two sides' views. The Japanese point out that microelectronics is an ideal industry for them to specialise in as their country has so few natural resources. They show how Japanese companies and their staff are quick to take advantage of electronics in their businesses. At the same time the Japanese say they are not strong on innovative thought, so they call for collaboration with Europe.

The Europeans accept these points, albeit gloomily. Some writers call for a more open market for all in Japan, while others suggest the Japanese could be using talk of co-operation to disguise their plans for entering the European market.

These views are put in the first part of the book, covering industrial change. The second half is less controversial and strong on statistics on everything from microcomputer sales to visitors to computer exhibitions.

John Kavanagh



"And remember, user time is money. So don't make your programs too efficient."

Good to keep as refresher course

Pascal Programming Problems and Applications, David T. Barnard and Robert G. Crawford. Reston Publishing (a Prentice-Hall company) £8.75.

BARNARD and Crawford, both of Queens University Ontario, have written a book of practical applications intended to supplement a programming text book as part of a university course. Examples have been collected for this book over the years, culled from classroom experiences.

Apart from the first chapter on algorithms and the rules for their expression, it consists of a series of problems of increasing complexity. Tuition is subtle: in working through the problems new aspects of programming are unfolded, so that the student is hardly aware of being taught.

Part I teaches programming language constructs; part II describes techniques for solving a wide range of problems; and part III is dedicated to practical applications in DP and numerical methods.

All the problem solutions are programmed in Pascal, but the authors point out that most of the situations covered occur in any language and are equally applicable to them. They also state that all the programs in the book have been tested.

Each step in solving a problem is explained clearly and concisely, which makes this a good book to keep as a refresher course as well as for initial learning.

Maggie McLening

Of more use to teachers than practitioners

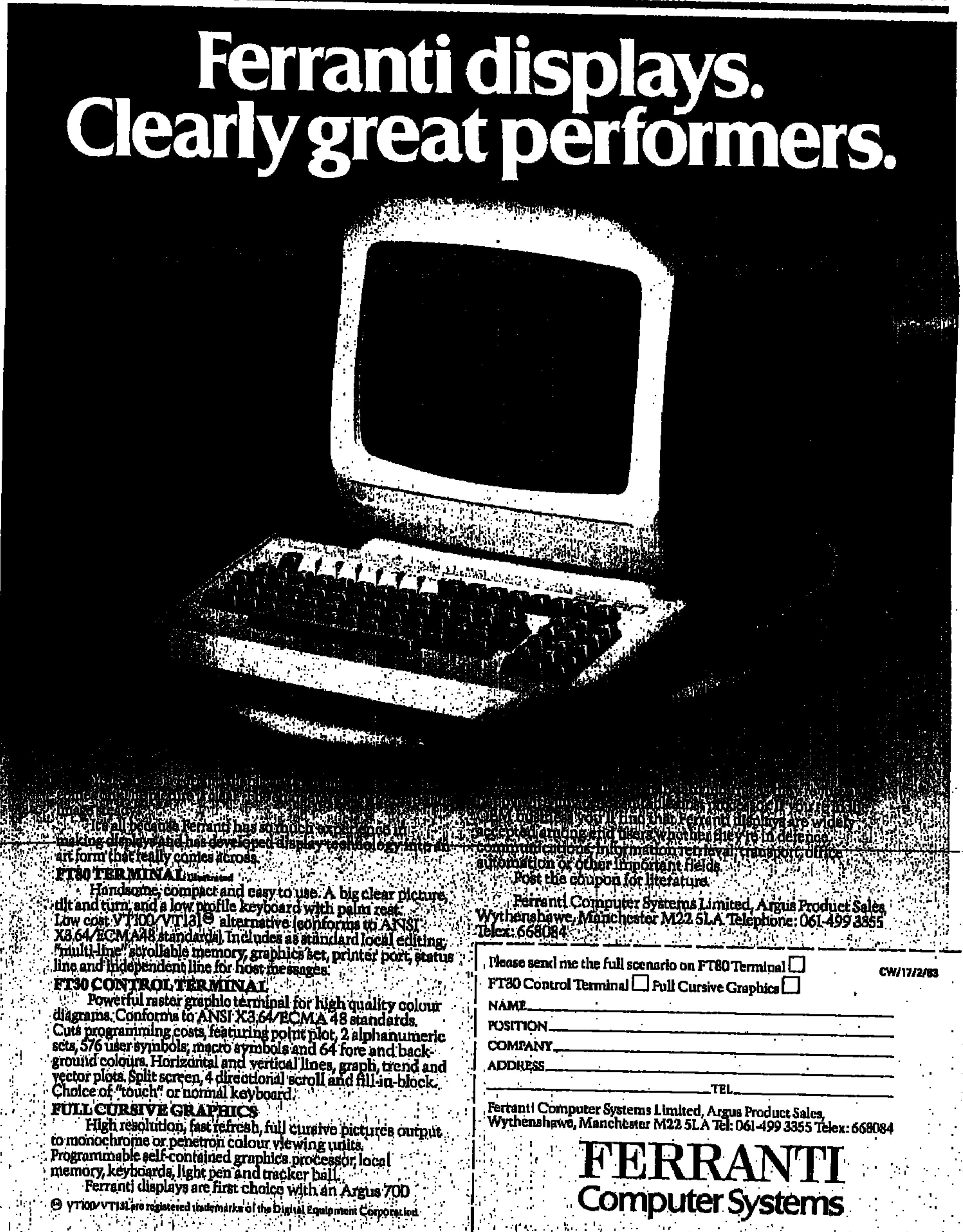
Information Systems Design. Cyril H. P. Brookes, Philip Grouse, D. Ross Jeffery, and Michael J. Lawrence. Prentice-Hall of Australia.

THE title might tempt many of us interested in the field to take a closer look. I believe the book might be of interest to teachers who are looking for a suitable textbook in the systems design area. It would not, however be of high interest to practitioners who are already well versed in the field, and are looking for new ideas.

As a textbook it is well written. The references are up to date and contain all the "structured" gang.

I would recommend to the authors that they update with Fagan's Inspection method instead of the older "walkthrough".

Tom Gilb



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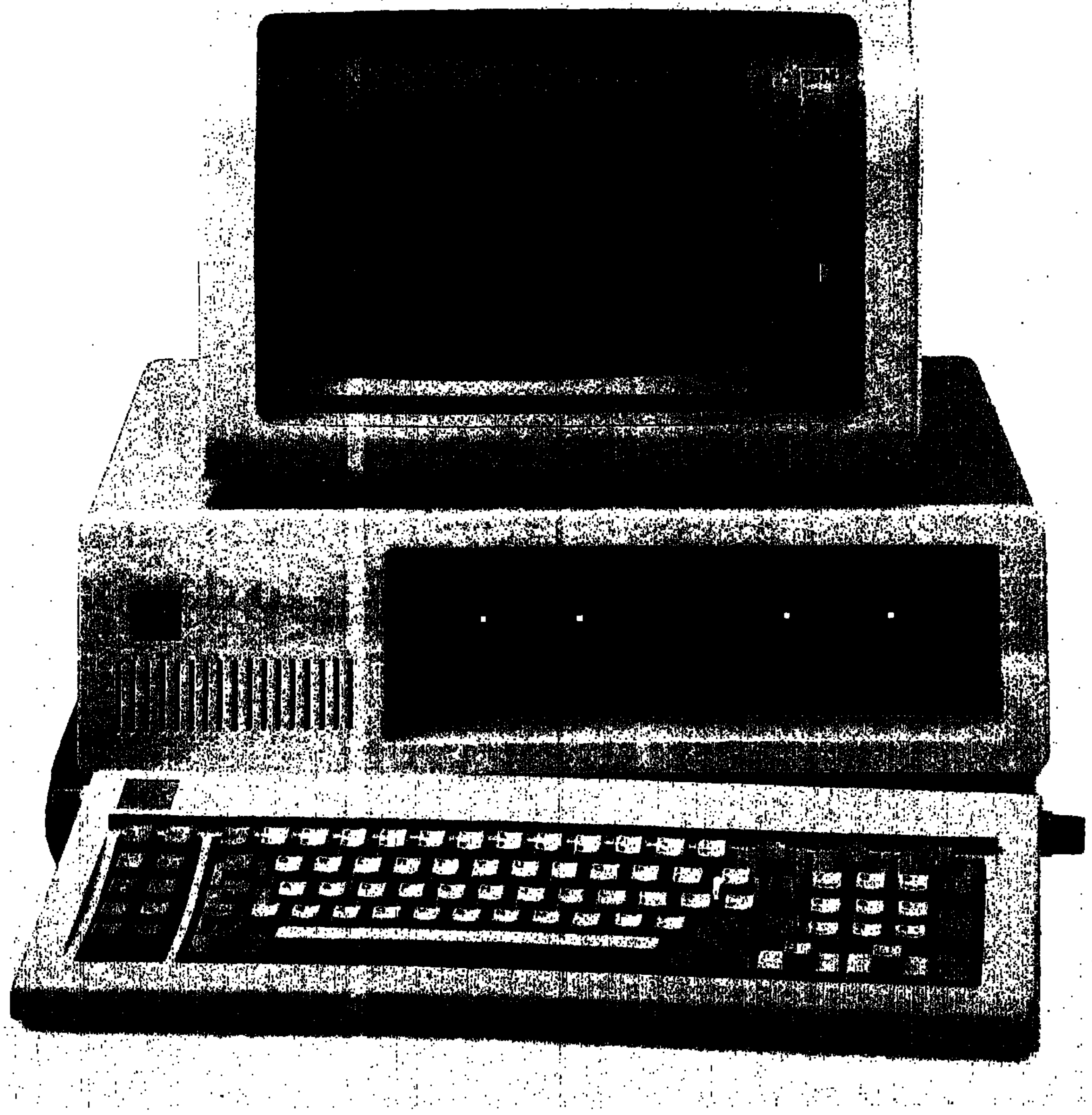
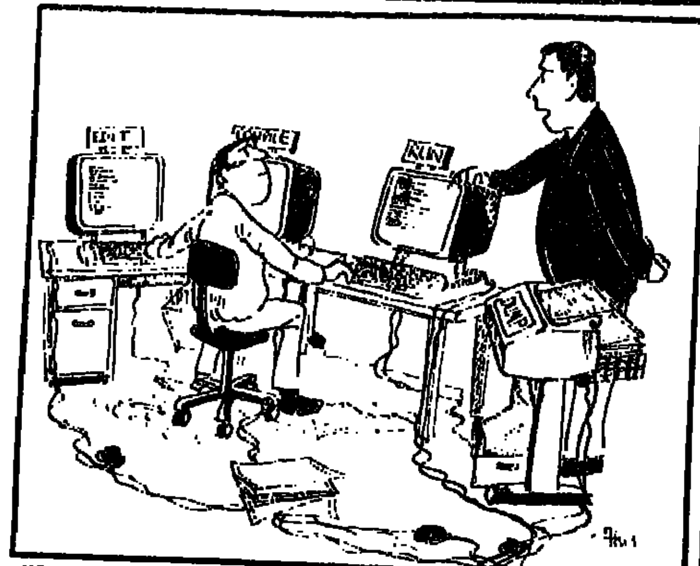


The computer installation run as a business


"It may be great for system development but no-one else can get a look-in".

The Economics of Information Processing. Edited by Robert Goldberg and Harold Lorin. John Wiley. Vol. 1. 238 pp. £20.35. Vol. 2. 185 pp. £18.50.

MOST FIRMS install a computer to be more cost-effective. Yet computing is a business in itself and if not run efficiently the value of the investment is diminished. According to its editors this book will help managers make sound cost-effective decisions on system development and management.

The claim is not unreasonable, and these two volumes should certainly go a long way to achieving their object. Goldberg and Lorin, both on the staff of IBM's Systems Research Unit, have assembled 34 interesting fact-filled papers. Seventeen of these are from fellow IBMers, 10 from other business data processing professionals, and seven from academics.

Volume One is subtitled "Management Perspectives" and begins with a consideration of the need for a coherent strategy for information processing, something sadly lacking in many organisations. Brandt Allen's paper on Computer Strategy was particularly helpful.

The first section of this volume also includes chapters on the pros and cons of centralisation and distributed processing, the management of a systems strategy, and the economic impact of networking. The remaining sections of Volume One are concerned with information requirement analysis, modelling, and the economic factors involved in the justification of information systems.

As Gerald Matlin observes in his chapter on the value of investment in information systems, many companies find it difficult to put a value on the results of their investment. Matlin's discussion of the evaluation of intangible benefits should prove useful to all managers who wish to demonstrate the value of their applications to the organisation.

"Operations, Programming and Software Models" are covered in Volume Two, which includes material on relations with users and communication with them through an appropriate chargeout method. There is also a chapter on alternative structures for information processing management, plus further discussion of centralisation and decentralisation.

Many will find the meat to be the chapters on applications development. These cover the use of standardised systems, application generators and programmer productivity measurement.

Alan Stewart

Landmark in micro language

A Dictionary of Minicomputing and Microcomputing. Philip Burton. John Wiley & Sons. £15.00.

CONCISE but colourful definitions, comprehensiveness, clear diagrams and plenty of space to make the text easy on the eye are the aims of this dictionary. It succeeds to a large extent but at the expense of economy and portability.

The one centimetre gap between each entry is wasteful. Half that space would have been as effective and would have saved at least 60 of the 346 pages. In addition the reprinting of definitions and diagrams contained in the body of the dictionary in 60 pages of separate subject-headed Appendices appears unnecessary. Dictionaries are consulted for individual words and not used as vocabularies.

The definitions are clear on the whole, although some are well below par; some omissions are inevitable and notable ones include OEM and CAM (CAD is included), and a misprint in a keyword "sequantial logic" for "sequential logic", however obvious, is unfortunate. The diagrams succeed very well, being simple and informative, although an illustration of "nesting" would have been useful.

The chatty style is endearing, but goes overboard at times.

In general though, the book will be found to be both useful and usable and provides a landmark in the rapidly evolving terminology of the mini and micro world.

John Riley

More to life than the blue giant, Mr Weil

Information Systems in the **ties.** Ulric Weil. Prentic £23.95.

IT IS HARD to see for whe book is written. Its author, Weil is a well-known New stock market analyst, perhaps known for his watching of That said, the only concei market for it is as an introd to the US computer industry people interested in inve there.

But if this was Weil's inten he has failed. Its coverage of industry, except, understan the chapter on IBM, is dis perfunctory. For example, tion on "supermini" com concentrates heavily on Computer and Tandem, but scant reference to Digital E ment – the second largest com ter manufacturer in the world IBM, or to Data General, lowing closely behind.

Wang, one of the fastest ing computer companies in merits only one mention, and packaged software he refers to linane but not MSA, the wor largest supplier of software pa ages.

Only the coverage of IBM is any way worthwhile, but even will merely serve as an introd tion to the topic.

And then there is the pri £24, for a book which virtu ignores the European inform technology industry. This too expensive for the level of co rage the book offers.

Kevan Pea

Fascinating puzzlers – but no pictures!

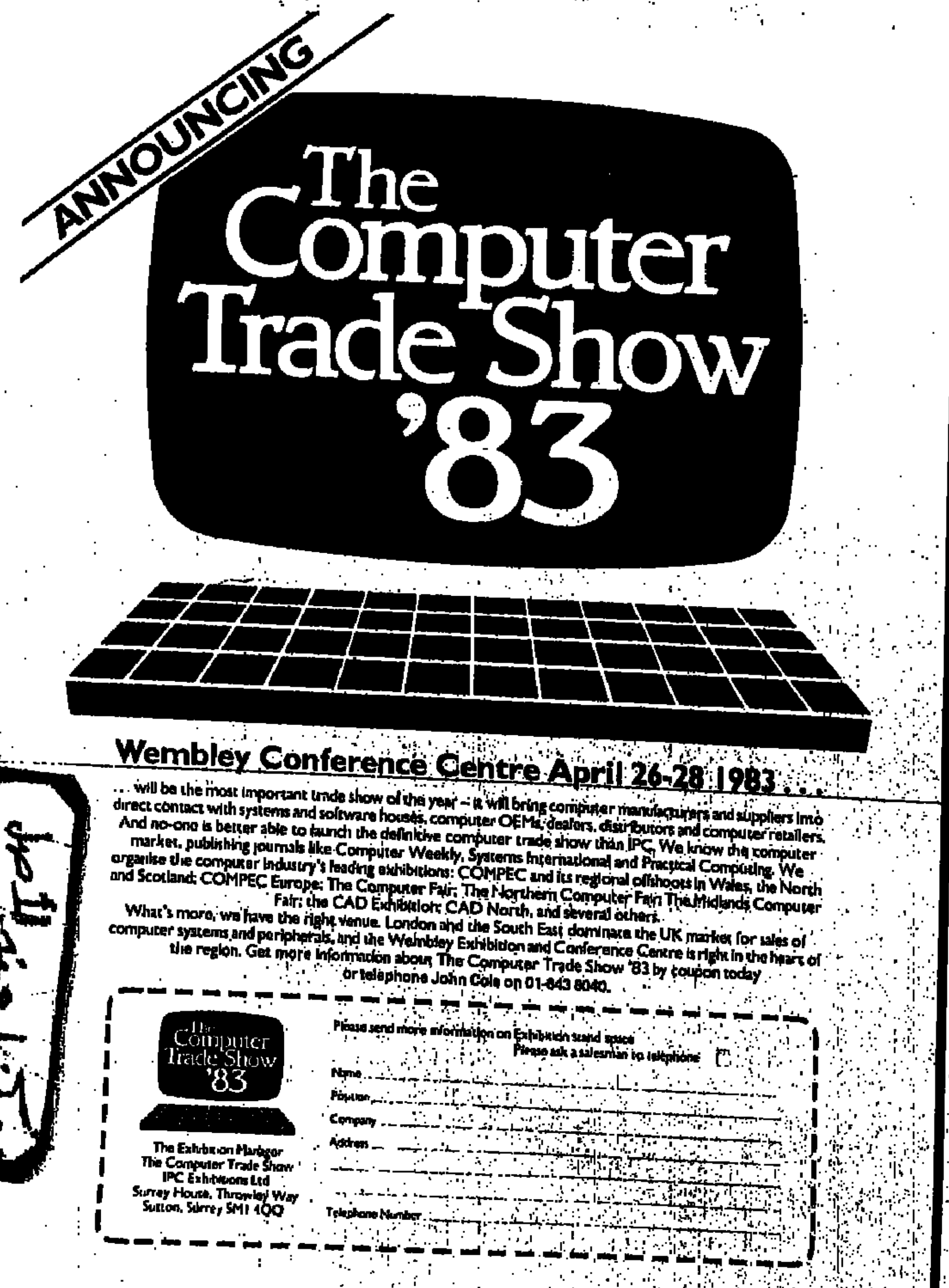
The C Puzzle Book, Alan R. Feuer. Prentice Hall. £10.35.

WHO EVER heard of a puzzle book that didn't have pictures or jokes? This one has neither and at first glance looks most unentertaining, for in spite of what might at first have been thought, it is not at all about using "C" to solve puzzles. Rather, it consists entirely of the kind of infuriating brain-twisters that used to appear in the worst examination papers.

After working painfully through a few pages, however, one suddenly gets a feeling for what it is all about. It's a set of Five Finger Exercises for the advanced "C" performer – marvellous stuff for toning up the grammatical sinews, but of no artistic merit (or pretensions) whatever. This revelation was quite refreshing, for the world is full of books on programming style (though few, perhaps, on "C" itself) but grammar exercises seem to be out of fashion. Perhaps this work will start a trend back to old-fashioned virtues.

In keeping with the book's intentions, it is precisely organised, terse in style, and there are no noticeable omissions of content. It is not a book for the novice programmer, nor do I think it would be very entertaining or informative to someone not already well acquainted with the language. On the other hand, it will quite likely provide many happy hours of harmless amusement to the committed "C" hacker.

Bill Tuck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A lively introduction to Pascal for students

Pascal for Students. R. Kemp. Published by Edward Arnold. £5.95.

TAKING no chances on the reader's background knowledge, Kemp wades in with a potted introduction to computers, covering applications, hardware, software, compilers, algorithms, flowcharts and brief descriptions of Cobol, Fortran and APL in just 11 pages.

This is surprisingly good, considering the enormity of the task, but could have been reduced still further by omitting the explanation of punched cards, which are rapidly becoming obsolete in the industry.

Once the reader has recovered his, or her, breath after digesting the chapter on fundamentals, it is straight into a Pascal program with no preliminaries on the meaning of the terms shown, or syntax.

The author goes on to explain what they all mean within the context of the sample program, however, and lays the foundation for a commercial programmer by pointing out what the result will be in application terms, a useful and pertinent exercise that is often omitted in text books.

This book would be excellent for use as a textbook by a group of students because the writing is lively, advice is realistic and it is full of examples that thoroughly illustrate use of Pascal. Because Kemp is senior lecturer at the School of Mathematics, Computing and Statistics at Leicester Polytechnic, perhaps the strength of the book is unsurprising.

It is, however, much less suited to someone attempting to teach themselves the language with no previous experience of programming.

Maggie McLening

DATABASE SYSTEM
Hud
"When you said it was floppy-based, that wasn't what I was expecting".

A sound approach to database design

Database Design Methodology, M. Vetter and R. N. Maddison. Prentice-Hall International. 306pp.

AN INTERESTING collection of advanced state-of-the-art material on database design methodology is presented here. The subject matter, examples, exercises and references have been gleaned from a variety of different sources: research journals, various teaching courses and the authors' own extensive experience. The aim of the book is to introduce a comprehensive database design procedure. This begins at the basic data modelling stage and proceeds through a number of distinct refinement steps.

Throughout the book the authors have used the three level Ansi/X3/Sparc database terminology as their basis for description and discussion. This is reflected in the book's overall organisation. There are thus individual sections dealing with the conceptual realm (chapter 4), the internal realm (chapter 5) and the external realm (chapter 6). The final chapter of the book discusses and consolidates the generalised design procedure that is introduced and advocated in the previous sections.

Each chapter of the book has an accompanying set of exercises for which answers are given. There is also a bibliography and reference list to support each of the chapters. Line diagrams and tables are used in an effective way to illustrate the various concepts that are introduced.

The book would make ideal reading for a DP professional looking for a sound approach to database design. It would also make a useful support text for a taught course. However, as a self-instruction text, many students might find some of the material a little difficult to assimilate on first reading.

Philip Bark

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PL/1 IMS DB/DC	PROGS
Cobol CICS	PROGS
IMS Data Base	DESIGNER
IMS/MVS	SYSTEMS SUPPORT
T.I. 990 Cobol	PROGS
System 38	ANALYST/PROGS

If you require further information or would like to discuss contract opportunities generally, please send your c.v. or telephone Richard Netts or Chris Smith on 01-439 1856

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London & Brussels

Computing Services Association

(2658)

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INTERFACE
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Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter to the Confidential Reply Supervisor.

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(2584)

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**Rodney Yates
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Austin Friars House
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(2380)

your appointments register

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HONEYWELL	Systems Programming experience	to £12K	Middlesex
DEC/HP/WANG/DG	Basic · Cobol	to £12K	Berks · Surrey
IBM 4341/COBOL	Financial/Insurance	to £10K	W Sussex
IBM	System exp.	to £16K	Essex
ICL/VMEB or K	Financial	to £11K	Surrey
IBM/UNIVAC/COBOL	On-line/Database	to £12K	Surrey
NCR/NEAT		to £11K	Kent

Analyst/Progs

BURROUGHS/COBOL	Commercial	to £14K	Surrey
IBM 34/38		to £15K	London/Home Counties/North
IBM/UNIVAC/ASSEMBLER	On-line/Database	to £12K	Surrey
HONEYWELL 64/66	Engineering background	to £10K	Staffs

Hardware/Support

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Systems Analysts

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IBM/BURROUGHS	Commercial Accountancy	to £15K	London/Surrey/Manchester
IBM	Insurance/Financial	to £15K	W. Sussex
ICL	Pensions	to £12K	Surrey
ICL 1900/2903/DME	On-line	to £10K	Cheshire

Software Engineers

CORAL/PASCAL/MASCOT/C	Communications	to £13K	Glos/Hants/Sussex/Midlands
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PROJECT MANAGERS	On-line/Database	to £15K	Surrey
TEAM LEADER	MVS	to £13K	London

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102, New St,
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Simon Johnson
01-637 0781
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(2548)

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY
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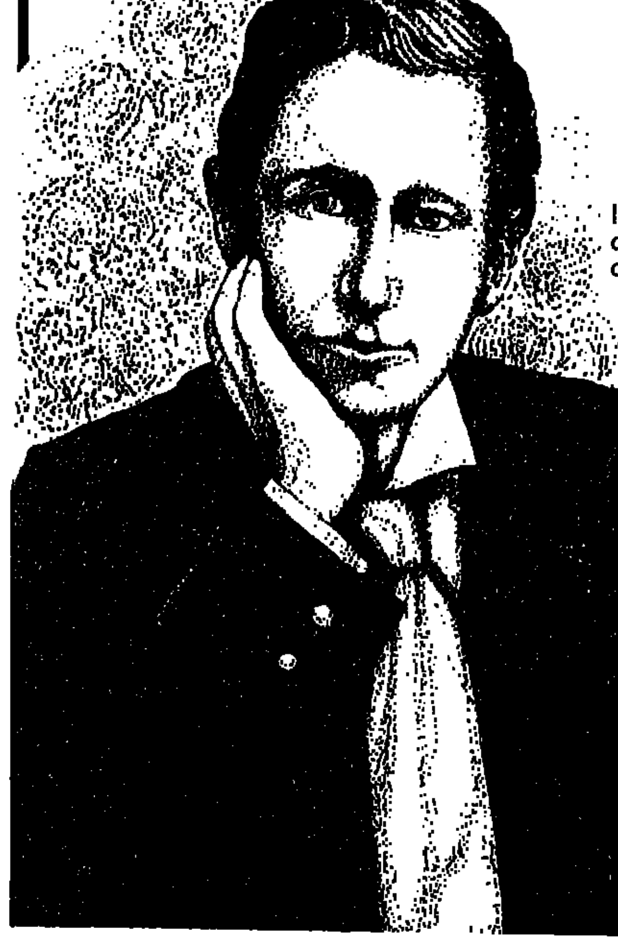

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Marconi
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CONTRACTS

We would like to hear from experienced analysts and programmers with the following skills for contacts in London and surrounding Counties.

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	Systems Programmer	DOS/VSE
	Programmer	DPCX
*ICL 2900		
	Database Specialist	IDMS
	Analyst/ Programmer Analyst	VMEB
*HP 3000		
	Programmer	COBOL

We are also interested in hearing from people with either IMS/ADF, CICS/COBOL, DL/1, PL/1, MARK IV, or Assembler.

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(2583)

KENT COUNTY COUNCIL

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(2545)

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Analyst/Programmer

for in-house systems to £10,000–£11,000 negotiable

Providing the computer systems needed to support WANG's immensely successful business operations in the UK is an exciting challenge in anyone's language. Your role will be in supporting, defining and developing the company's internal commercial systems and you will have the opportunity of applying new technology to applications. The job is based at our new UK headquarters in Isleworth, although occasional travel to other sites may be necessary.

Applicants, aged mid-20s and educated to at least 'A' level standard, require a minimum of 2/3 years' COBOL experience and should have at least 6 months in an analysis role. Experience of WANG or IBM kit is preferable and on-line experience essential, as is an ability to relate to both computer professionals and non-technical staff within the company.

Benefits include pension, BUPA, free life assurance and Stock Purchase scheme. WANG is a fast-growing company and opportunities for career progression are exceptionally good.

Interested applicants should send full c.v. to: Mary Gilgallon, WANG (UK) Limited, WANG House, 661 London Road, Isleworth, Middx. TW7 4EH. Or telephone 01-560 4151 for an application form.

(2374)

WANG
THE OFFICE AUTOMATION COMPUTER COMPANY

logistix

Logistix Recruitment Limited
10 Grenville Place, London SW7 4RW

Telephone 01-373 3063

Systems Software Engrs
W. Germany & Benelux : Salaries to £20K

The continuing success of a small, expanding German Systems and Software House has created a number of Systems Programming vacancies in both W. Germany and Belgium. Whilst the variety of work offered is immense, specific skills should lie in one or more of the following areas:- Compiler Development (especially ANSI Cobol), PLM 86 programming, Pascal or other block-structured languages and communications systems design incorporating X25 protocolling techniques. Natural language ability is not a prime requirement but an understanding of German in either written or spoken form will attract a salary premium. Full relocation expenses will be met. **Ref: L/5/A**

Graduate Progs
London & H. Counties : Salaries to £7.5K

A number of exciting opportunities have arisen in London and the Home Counties for Programmers who have recently graduated. You should hold a first or second class honours degree in Mathematics, Computer Science or Electronic Engineering. Of particular interest will be applicants who have completed a sandwich course and can offer twelve months' industrial training experience. It is essential for all positions that you offer fluency in PASCAL, 'C', ADA or Assembler. Ideally your project work should have included compiler writing, artificial intelligence, UNIX or firmware development. **Ref: L/5/B**

Real-time Software
South Coast : Salaries £10K+

A number of our clients, including Systems and Software Houses and Manufacturers, have vacancies for **Programmers and Analyst/Programmers** with at least 18 months' industrial experience. All applicants should have been involved in the development of a real-time system based on either PDP-11s running under RSX-11 or RT-11 or Data General minicomputers. Programming skills should include fluency in at least one high-level, block-structured language and an Assembler. Many of these positions are for UNIX-based systems vacancies and should therefore, appeal to candidates who wish to enhance their skills. **Ref: L/5/C**

Compiler Development
London & H. Counties : Salaries to £14K

A major Systems and Software House has recently embarked on a large new project requiring the expertise of a number of **Compiler Development Specialists**. Suitable candidates will have participated in the development of either a Pascal or Ada compiler, preferably for 16-bit micros. Familiarity with all phases of compiler development is strongly desirable with particular emphasis placed on Code Generation and Optimisation. Whilst specific responsibilities will vary, depending on the ability and experience offered, all successful candidates will be involved from initial proposal stages through to the creation of a fully self-supporting compiler. **Ref: L/5/D**

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Process Control
Central London : Salaries to £14K

A leading international Systems Supplier is currently seeking to recruit a number of additional **Programmers and Analyst/Programmers** for its industrial division. Suitable applicants will be graduates with a minimum of two years' programming experience gained within a real-time minicomputer or micro-processor based environment. Whilst there is no particular hardware requirement, knowledge of DEC PDP-11, HP1000, HP3000 or Intel 8085/6 would be a distinct advantage. You will join a multi-disciplinary team in which members have specialist knowledge of, for example, communications, control systems, automation or CAD/CAM. Projects will be within the oil, gas, electricity and manufacturing industries. **Ref: L/5/E**

UNIX Programmers
London : Salaries to £12K

An Internationally renowned Product Supplier is currently seeking to recruit a number of **Systems and Applications Programmers** to work on its recently introduced UNIX-based product range. Suitable applicants should hold a numerate degree and have a minimum of two years' development experience in a mini-computer or micro-processor based environment. It is essential for all positions that you are fully familiar with the internals of UNIX and that, additionally, you offer fluency in C and an Assembler language. Working in a dynamic and flexible environment you will be involved in the development of UNIX based systems for the commercial market. The majority of development work will take place in Central London but a degree of mobility is essential for client visits. **Ref: L/5/F**

Comms Systems Software
Herts/Beds : Salaries to £14K

The Communications and Networking Division of a well-known Turnkey Systems Supplier has a number of career positions for **Software Engineers and Designers**. Candidates should hold at least a B.Sc. or H.N.C. qualification and have subsequent commercial/industrial experience amounting to 18 months'. Certain positions will be exclusively in-house based whilst others will entail a systems support role. Of interest to the Company will be those who have software or systems design experience with a supplier of wide and local area networks – an in-depth knowledge of X-25, SDLC/HDLC protocolling techniques is obligatory. A salary premium will be paid to those who have participated in the enhancement or optimisation of a UNIX or UNIX look-alike operating system. **Ref: L/5/G**

Firmware Programmers
Thames Valley : Salaries to £11K

A small but rapidly expanding company has a number of vacancies for **Firmware Programmers/Designers** to join its product development group. Acting as the external development department for many of the leading names in the industry, the company is able to offer a wide range of hardware and software involvement. Suitable applicants will be graduates with a B.Sc. or M.Sc. in Electronic Engineering or Computer Science. It is essential that you offer fluency in Micro Assembler with additional knowledge of a block structured language such as Pascal or 'C', being desirable. Mostly based in-house you will be involved in the development of intelligent terminals, data capture equipment, multi-micro communications processors or ATE software. **Ref: L/5/H**

Navigation Systems
Thames Valley : Salaries to £13K

A supplier of electronic and precision instruments is seeking several **Software and Systems Engineers** for its U.K. Head-Quarters. Suitable applicants must be numerate graduates who are currently involved in the design and development of micro-processor based automation and control systems. Programming skills should include total fluency in at least one of:- Pascal, Assembler (and in particular Macro-11) or 'C'. Candidates must have the ability to resolve complex software problems for end users where total reliability is paramount and operating conditions are adverse and not conducive to high technology products. Those who have significant systems design experience where guided weapons and missile control systems are under development are particularly encouraged to apply. **Ref: L/5/I**

Military Systems
London Based : Salaries to £15K

A London based Systems and Software House specialising in the design and development of scientific systems is seeking additional personnel with specialist knowledge of military systems. Suitable applicants will be graduates with a first or second class honours degree in a numerate subject. You should offer a minimum of eighteen months experienced gained in a mini-computer or micro-processor based scientific environment. There is no preference for programming languages as the company provides excellent in-house training, but fluency in PASCAL, FORTRAN, ALGOL or CORAL 66 would be a distinct advantage. Your applications knowledge, which will be of primary interest to our client, should include one or more of Simulation, Statistics, Operations Research, Automotive Control or Communications. **Ref: L/5/J**

Micro Development Engrs
North Bucks : Salaries to £12K

The European Development Head-Quarters of a major micro-computer manufacturer has a number of vacancies for **Senior Applications Development Programmers**. Fluency in Pascal, 'C' or other high level languages is sought, as is a degree in Computing Science, Electronic Engineering or a similar discipline. Of special interest will be those with knowledge of how to integrate a real-time operating system kernel into applications software, especially in multi-tasking, multi-processor systems or alternatively, have gained experience in the use of an M.D.S. to integrate hardware, software and firmware into application/demonstration systems. Successful applicants will be rewarded with a high salary and the opportunity to work on the latest generation of micros. **Ref: L/5/K**

Simulation Engineers
Herts : Salary to £13K

A number of challenging opportunities have arisen for **Software Engineers and Designers** with a North Hertfordshire based Turn-Key Systems House. You should hold at least one numerate degree and be aged 23-32 years. Whilst the Company's software products are machine portable there is a preference for candidates with Fortran programming experience on PDP/VAX, Prime, HP or GEC hardware. Of greater importance are those who have very recent or current software design and applications programming experience with one or more of LSI and hybrid circuit design, simulation and modelling of ballistic/dynamic systems, signal processing and CAD/CAM. **Ref: L/5/L**

Micro Software
Cambridge : Salaries to £12K

Programmers and Software Team Leaders are urgently required to assist in the development of applications and systems software for a new generation of micro-computers. Successful candidates for the positions of Team Leader will be fluent in a high-level block structured language and have specified and implemented at least one compiler. Working in-house, their responsibilities will include the design, development and commissioning of systems software and the evaluation of commercial packages submitted by sub-contractors. Programmers will also be expected to offer fluency in a block-structured language and, preferably have gained experience on micro-based systems. High standards of documentation are required of all respondents who, in return, will be rewarded by highly competitive salaries and a dynamic working environment. **Ref: L/5/M**

(2448)

BASIC-PLUS PROGRAMMER

Goldrel Foucard – members of the fast-expanding **NORTHERN FOODS GROUP**, a company with annual sales exceeding £1,000 million – are leading suppliers of high quality ingredients for the bakery and catering trades. The company has invested considerably in computerisation and wishes to appoint a

BASIC-PLUS PROGRAMMER

who will be involved in both development and maintenance activity. The successful candidate will join a small but highly motivated team within which there will be considerable scope for initiative and originality.

Experience of programming in basic plus – ideally over a minimum of 3 years – is essential while candidates should also be familiar with file-handling techniques preferably on Systime 5000 hardware.

Terms and conditions of employment within Goldrel Foucard are competitive as would be expected from a group of our size and an attractive salary will be offered with this post.

Should you wish to be considered for the appointment, please send full details of your education, work experience and current salary to:

John Parr, Personnel Manager
Ch. Goldrel Foucard & Son Ltd
Brookfield Drive, Aintree
Liverpool L9 7AW

(2441)

University of Exeter

LECTURER IN COMPUTER SCIENCE

Applications are invited for a lectureship in the Department of Computer Science, tenable from 1 October, 1983.

The research interests of the Department are in the areas of artificial intelligence, design and formal aspects of programming languages, data bases and information retrieval, distributed computing, and computers in education. However, well qualified persons in other areas of computer science are also welcome to apply.

Commencing salary will be within the range £6,375 – £9,800 p.a. on the scale £6,375 – £13,505 p.a.

Further particulars may be obtained from the Personnel Office (Appointments), Northcote House, The Queen's Drive, Exeter EX4 4QJ, to whom applications (6 copies, overseas candidates one copy), should be forwarded by 11 March 1983, quoting reference no. 3295.

(2469)

University of Surrey

COMPUTING UNIT

Deputy Director (circa £15,000)

Responsible for the provision of computing services to academic and administrative departments, the Computing Unit is presently equipped with seven linked Prime computers and an array processor, an ICL machine and numerous microcomputers. The activities of the department include medical viewdata and knowledge-based systems.

A Deputy Director is required for this progressive department and the successful applicant will deputise for the Head of Department for a wide variety of duties both inside and outside the University as appropriate. The Deputy will be directly responsible for the management of the User Support Group which provides programme advisory, information and teaching services, development of operating system software and libraries, and help with user projects. He/she will also take overall responsibility for the operations activities of the department.

Candidates should have a lively and flexible attitude, proven management ability, wide experience in programming and good academic and professional qualifications.

A negotiable salary on the Academic Related Computer Staff salary scale, Grade III (circa £15,000), plus generous annual leave.

Further particulars may be obtained from the Deputy Secretary (Personnel), University of Surrey, Guildford, Surrey GU2 5XH, or telephone Guildford 571281 extension 583. Applications from men and women in the form of a curriculum vitae, including names and addresses of three referees should be sent to the same address by 7 March 1983 quoting reference 128/CW.

(2473)

BOX NUMBERS

Box number replies should be addressed to:

Box Number ....

c/o Computer Weekly
Quadrant House, The Quadrant
Sutton, Surrey SM2 5AS

SALES EXECUTIVE
South East

To sell the market-leader range of viewdata terminal systems.

Tandata is growing rapidly, and this ground-floor opportunity will suit an enthusiastic salesman/woman seeking to join a young organisation at the right time.

The successful person will be young and well-educated, with sales experience, preferably in computer terminals or micro-computer systems. Full viewdata and product training will be provided.

The territory will include a major part of London and the Home Counties. A company car will be provided. and earnings well into five figures can be expected. Other benefits include four weeks holiday and a pension/life insurance scheme.

To apply, please write, with details of background and experience, to Peter Dodds, Sales Director, Tandata Marketing Limited, Class International, Wells Road, Malvern, Worcs.

Tandata

Large Installation – IBM 3083B

Chief Systems Programmer
(£12,174 – £13,413)

Hampshire County Council need a Chief Systems Programmer to lead a small team supporting an expanding and progressive installation in Winchester.

The current hardware consists of two 8 Mb 4341 group 2 machines, to be replaced during the next few months by a single 16Mb 3083B. The operating systems are VM/SP and OS/VS1, with interactive applications running under CMS and CICS. Migration to SNA and MVS is being considered.

Applicants for this post should have several years systems programming experience with mainline IBM operating systems, and should welcome the challenge of working in a rapidly changing environment.

Operations Staff

Shift Leader
(£9349 – £9990)

Senior T.P. Network Operator
(£7903 – £8676)

The shift leader will have responsibility for one of three rotating shift teams, operating 24 hours a day, 5 days a week.

The Senior T.P. Network operator will have responsibility for one of two alternating shifts operating 7a.m. to 8p.m., 5 days a week.

For application forms and further details telephone Winchester 54411 – Alice Lowery (Ext. 346) or Brian Woodruff (Ext. 457) or write to the Departmental Personnel Officer, County Treasurer's Dept., The Castle, Winchester, Hants. Closing date for applications 7th March 1983.

HAMPSHIRE

(2581)

PROJECT LEADER
BIRMINGHAM **to£12,000**

The Computing services division of a major National company require a PROJECT LEADER for a significant development project. Experience of leading and motivating teams and designing On-Line systems is required and considerable scope for career development is offered.

SYSTEMS ANALYST
COVENTRY **c£11,000**

A leading Midlands based software house require a Systems Analyst to join a team developing mini based bespoke systems. An excellent benefits package is offered in addition to the salary quoted.

ANALYST/PROGRAMMER
BIRMINGHAM **c£9,000 NEG**

Our clients require an Analyst/Programmer with IBM S38/RPG III experience. The ideal background would include exposure to manufacturing systems. Excellent opportunities exist for further progression.

ANALYST PROGRAMMERS
WORCS **£ NEG**

A number of PROGRAMMERS & ANALYST/PROGRAMMERS are required by this well-known systems house. Experience with FORTRAN or BASIC on DEC/PDP/VAX hardware would be of particular interest. Excellent salaries and opportunities.

PROGRAMMER
STAFFS **c£7,000**

An excellent opportunity exists for a bright young FORTRAN programmer, preferably with DEC/PDP equipment and a scientific backgroung. Around 2 years experience is required.

SUPERVISOR
BIRMINGHAM **£ NEGOTIABLE**

A versatile and enthusiastic character is needed to oversee a computer system in Birmingham. Experience in operations/data preparation with a small business machine such as the ME29 or PDP11 would be particularly relevant.

For further details of these and other excellent opportunities contact our BIRMINGHAM office.

TCR **Targa Computer Recruitment**

8 Liverpool Street London EC2M 7NH Telephone 01-283 9941 Telex 25861
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Communications and Basic Software

London

The CAP Group is one of Britain's leading information systems contractors. With over 880 staff we design and implement systems in all areas of computing.

CAP London Industrial Branch is very active in the areas of data communications and basic software. As part of our expansion programme we have vacancies at various levels.

£15,000-
£18,000
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To be responsible for a business group within the Branch concerned with basic system software, software development environments, software standards and data communications. Candidates must have technical background with substantial software project development experience plus proven skills in selling, marketing and business management.

£11,000-
£16,000

CONSULTANTS

Two positions exist for software specialists with experience in some of the following areas: communications networks, protocols and hardware; packet switching; distributed development environments; H-P and DEC systems. For one of the positions knowledge of UNIX would be an advantage. For the other position an understanding of the telecommunications industry plus experience in the design and implementation of major communications based systems is essential.

We offer an established career development scheme to ensure that proper attention is given to individual progress.

For further information apply to:- A. V. W. Knott, Recruitment Manager,
CAP LONDON INDUSTRIAL,
20-26 Lambs Conduit Street, London WC1N 3LF.
Telephone: 01-404 0911.

CAP

(2551)

SYSTEMS DEVELOPMENT
SUSSEX COAST

Our client is about to embark on an aggressive development programme using an ICL 2946 with IDMS, STATUS, PROSPER and other databases. They require additional staff with a sound COBOL background to strengthen their small friendly team. A knowledge of IDMS is preferred but training will be given if necessary.

ANALYST/PROGRAMMER
to £12,500 + Bonus

Acting as assistant to the Data Processing Manager, you will specify, design and implement systems enhancements and developments. A minimum of 3 years' ICL COBOL is essential and preference will be given to applicants with on-line systems experience.

SENIOR PROGRAMMER
to £11,000 + Bonus

A Senior Programmer or Programmer/Analyst is required to be responsible for maintaining a stable operating environment and assist in all aspects of system development. You will also be responsible for program specification and design through to testing and implementation. Extensive COBOL programming experience and a good grounding in DME 2 utilities is essential. IDMS or on-line programming experience will be advantageous.

A significant benefits package includes relocation assistance if necessary.

Please reply quoting Ref: RIR

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AN ETHICAL SERVICE FROM PRACTISING COMPUTING CONSULTANTS

(2573)

PRIME

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The Kingdom of

SAUDI ARABIA

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Plus free accommodation, car allowance, flights, etc.

Our clients are a major organisation in the process industry with computer-based systems in both commercial and technical areas. A range of equipment is currently installed including PRIME 750, which is used for all business applications. DBMS database and on-line processing techniques are used throughout the installation.
Expansion of current systems together with the planned introduction of new projects has generated the need for the following personnel. PRIME experience preferred for all positions but IBM or Mini backgrounds will be considered except where stated.

Database Administrator

A sound knowledge of Prime DBMS is required for this key role with some time having been spent in the DBA function. Salary may be negotiable.

Senior Analyst

Materials Management and Plant Maintenance

Engineering background required preferably in the process industry. Applications include materials control, plant maintenance, planning, etc.

Junior Analyst and Analyst Programmers

Materials Management

COBOL plus DB and on-line experience is required preferably on engineering type systems.

Software Specialist

Relevant experience required for Tuning, Planning, Generation, etc. PRIME/PRIMOS DBMS Systems.

Senior Analyst

Finance and Accounting

Applications include cost accounting, financial, budgets, sales order processing, despatching, etc. Engineering background preferred.

Analyst Programmers

Finance and Accounting

COBOL and DB on-line experience in the accounting/finance area is required, ideally in an engineering environment.

O & M Analysts

For interdepartmental systems and clerical procedures relating to computer-based projects.

The company is located in the Eastern province in Saudi Arabia in a relatively new and expanding area. Social amenities and sporting facilities are good and include an excellent beach, sailing, squash, tennis, etc. Appointments will be offered on a permanent basis with an initial period single status after which married status with education allowances, etc., will be available. The total package is very good and includes a high base salary, free furnished accommodation, medical cover, 6 weeks' holiday, transport allowances, flights, etc.

For more details please contact Roger Allington or Jenny Dalrymple-Hay on 01-493 2947 from 9 a.m. to 9 p.m. weekdays or weekends Roger Allington on Little Gaddesden (044284) 3536 or Jenny Dalrymple-Hay on Beaconsfield (04946) 4579 quoting Ref. 9954.

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(2594)

S/34

PROGRAMMER/ANALYST

SWANSEA RPGII £10,000+

The company currently sells a wide range of software packages for Estate Agents, Auctioneers and Valuers on IBM equipment. Due to continued expansion additional persons for the System/34 are required to develop new systems and support existing customers.

Candidates should have a minimum of two years' RPGII experience and a good working knowledge of System/34 equipment.

Salary is negotiable.

Please apply for application form to:
Ceri Williams, Parkhurst Finance Limited,
88/89 High Street, Swansea, West
Glamorgan. Tel. 0792 462253

(2611)

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VAX, PL/1 Programmers
minimum 4 years experience
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ICL 2900 COBOL/VME-B Programmers
PL/1 (French competence)
ICL 2900 FORTRAN Programmer
PL/1/APL/IBM (TSO advantageous)

Please contact in the first instance, Sally Lawrence on 01-952 8092 (office hrs) or on 01-906 2617 between 6-8pm.

Howard Organisation
International Limited,
Russell House,
140 High Street, Edgware,
Middlesex HA8 7BS.

Employment business section

UNIVERSITY OF CAMBRIDGE

SYSTEMS ANALYST/PROGRAMMER

Applications are invited from suitably experienced candidates for the above post in the Administrative Data Processing Section. The section is equipped with an ICL 2904/50 and provides Student Records, Accounting and Payroll services, both batch and on-line, for the University. Applicants must have considerable programming experience in COBOL and experience in on-line systems. A knowledge of ICL computers would be an advantage.

The person appointed will, in the first instance, be responsible for the development, implementation and thereafter the maintenance, of a new Student Records system and experience of University procedures may be helpful.

Salary will be in accordance with Computer Officer Grade II – £8,510 p.a. to £11,895 p.a.

Applicants should forward details of their career to date, their age, present salary and the names and addresses of two referees, in confidence to: The Treasurer, University Financial Board, The Old Schools, Cambridge, CB2 1TS, to arrive not later than 8 March 1983.

(2567)

KEEN YOUNG BASIC PROGRAMMER

MICROS/MINIS
EAST LONDON-ESSEX

Cowlards
32 River Road
Barking, Essex
Tel: 01-594 9916

(2614)

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School of Engineering & Science

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Science graduate required to work on integrated computer aided design and manufacturing systems.

Salary depending on qualifications and ability. Application form and further details from Establishment Office, PCL, 309 Regent Street, London W1R 8AL. Tel. 01-580 2020 ext 212. Closing date:

PLEASE INSERT DATE 14 DAYS FROM LAST ADVERTISEMENT

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FACULTY OF TECHNOLOGY

Department of Mathematics, Statistics and Computing

Senior Lecturer/Lecturer II in Computing

(SALARY: £6,855-£12,816)

(LEVEL OF APPOINTMENT AND STARTING SALARY DEPENDENT UPON QUALIFICATIONS AND EXPERIENCE)

Applicants should have relevant commercial, research and/or teaching experience and be able to offer specialist knowledge in applications of information technology. Applications are also invited from recent or currently completing postgraduates.
The successful candidate will be required to teach on both Degree and Diploma courses in Computing.

Application forms, to be returned on Tuesday, 15th March, 1983, can be obtained with further particulars from the Personnel Officer, Plymouth Polytechnic, Drake Circus, Plymouth PL4 8AA.

(2598)

THE LONDON HOSPITAL MEDICAL COLLEGE

(University of London)

SUPERVISOR OF COMPUTER SERVICES

Applications are invited for the above post from graduates and/or those holding an appropriate professional qualification.

The appointee will be in charge of the computer section which has a staff of three currently. Terminals connected to the 2980 at Queen Mary College, a number of Microprocessors, and a PDP 11/10 computer are in use; the latter is used for both local processing and as a remote terminal to the computers in London University.

The post requires administrative, advisory and systems development abilities; a first degree in mathematics would be helpful though not essential.

Salary will be within the scale £10,870/£13,605 (Grade II) or £12,920/£16,180 (Grade III) plus London Allowance, with superannuation within the USS. Appropriate honorary academic status (Senior Lecturer, or Lecturer) will be sought for the successful applicant.

Applications, giving full details together with the names of two referees, should be forwarded to Mr J. W. Walmsley, Secretary, The London Hospital Medical College, Turner Street, London E1 2AD (within 21 days) from whom further particulars may be obtained.

(2606)

ENGINEERS

COMMUNICATIONS SOFTWARE

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One of the world's largest major forces in telecommunications technology require Software Engineers (male or female) with the following essential experience:

★ Large Digital PABX Systems
★ Call Processing
★ Coral and Pascal Programming
★ Education to ONC or above

This is an outstanding opportunity to join a dynamic growth international company whose revolutionary processes have given them a significant lead in digital PABX development.

Financial rewards include five-figure salaries and a comprehensive package of benefits.

For further information and confidential interview write to or telephone Christopher Fry on 01-235 9614 (office hours) or 05827 2354 (evenings and weekends).

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(2604)

Consultancy with CAP in New York

$30,000-$45,000

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We are now recruiting staff with IBM, and/or DEC expertise in one of the following:–

SENIOR ANALYST
with Banking, Dealing and/or commodity/metals trading applications experience and the ability to assume a leadership role in the development of a variety of systems.

COMMUNICATIONS SPECIALIST
with the knowledge of SNA, X.25, etc to design and implement systems for international banking applications and message switch environments.

DATA BASE SPECIALIST
experienced in one or more data base management systems including IDMS, IMS, ADABAS to develop data base systems and advise our clients on selection of the DBMS appropriate to their requirements.

We offer a competitive U.S. compensation package commensurate with your expertise. Company benefits include full medical insurance, 4 weeks holiday, pension and training. The relocation package includes temporary accommodation, appropriate visa and legal fees, a relocation allowance and reasonable shipping costs.

Candidates must have a Degree and be prepared to make a genuine commitment to working in the U.S.

Candidates will be interviewed in London by an ex U.K. member of our New York office. Apply with career details to:–

Tony Knott, Recruitment Manager,
CAP GROUP, 20-26 Lambs Conduit Street,
London WC1N 3LF.
Tel: 01-404 0911 or evenings 01-485 3813.

CAP

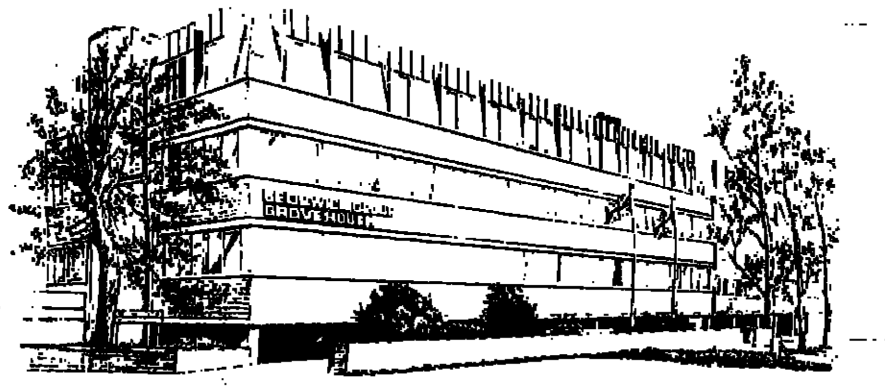
(2598)

Sedgwick

Sedgwick are the leading UK multinational broking group. They operate worldwide, handling insurance business originating from 108 countries. Some of the world's largest and most complex projects in aerospace, oil exploration, nuclear energy and construction, involving expenditure running into billions rely on advice and service from a firm like Sedgwick.

The current line-up of IBM mainframes will be augmented, mid '83, by the arrival of an IBM 3083, and large on-line and database developments are already underway. Sedgwick also make use of IBM 8100 hardware and a range of DEC minis.

Sedgwick are located in Witham, Essex. The complex offers a spacious and carefully planned working environment, utilising the latest office technology. In addition to this there are free restaurant facilities, free life assurance, excellent pension scheme and an active sports and social club.



Project Manager to £16,500 (Systems Assurance)

Sedgwick require a Project Manager to establish a systems assurance function responsible for the check and balance of applications development from a quality point of view.

The responsibilities of the successful candidate will include reviewing and establishing standards, project control procedures, estimating techniques and productivity monitoring techniques. He/She will advise on methods of project control and provide input to training requirements as necessary.

It is likely that the successful candidate will have approximately 8 years in D.P. and is now at project management level in a similar type of area with experience of conducting reviews of projects, standards etc.

If you would like to discuss this position further please telephone Andrew Beacham on 01-734 7394 or on 223-8507 in the evenings or at weekends.

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(2591)

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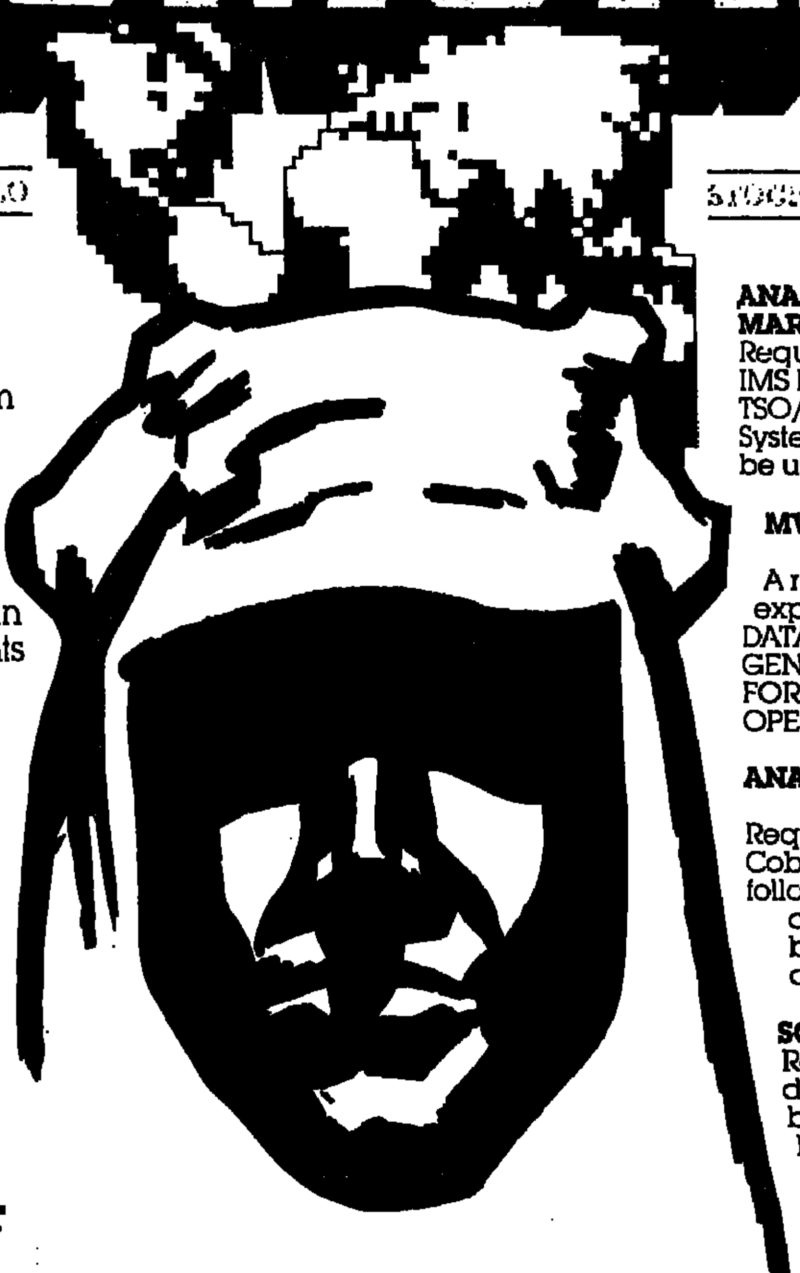

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Well-paid jobs are to be found in the private sector, for those with a couple of years' experience, says Margaret Park

North's a good move for skilled software staff

THE North of England is no longer associated with prosperity and full employment. The state of the region is even reflected in the computer industry, in the form of a dramatic split between opportunities in the public sector and jobs in private companies.

The picture is not altogether gloomy, but it describes the expected effects of a recession. There are jobs to be had, but, as usual in lean times, experience is most in demand. There are fewer jobs for the newcomer and turnover is slow.

People living in the North, particularly the North-east are hanging on to the jobs they've got and are not taking the risks usually associated with a mostly young workforce in a growing industry.

In public sector installations opportunities are almost non-existent, which should mean that Northern private employers now have the pick of skilled software staff.

One of the biggest installations in the region is the Department of Health and Social Security's computer centre at Washington in Tyne and Wear.

Data processing manager is Alan McPherson, who has a staff of 120. "The plain fact is we've had virtually no staff movement at all over the past 12 months," he said.

McPherson thinks the main reason for his settled workforce is that they can't see many opportunities elsewhere.

"If they wanted to move on in the Civil Service," he said, "they'd either go to the DHSS central office 10 miles away, or would move into general management which is the wrong move for our computer staff because they get an extra allowance for their DP specialisation."

Most government departments are cutting down on staff through natural wastage. Even this has slowed down in Tyne and Wear – the only leavers now are those of retirement age.

"We used to get a lot of wastage from DP grades," said McPherson, "but now there aren't the attractions outside."

Turnover from staff employed by the government is usually fairly rapid in the computer industry because of the salary competition offered by private industry. The usual story is of public bodies – the National Health Service is a good example – frantically looking for qualified staff but not being able to match the incentives in private computing.

Two of the other biggest Northern employers, Compower and British Steel, have fallen on much-publicised hard times.

Compower, which employs 90 computer staff at Gateshead, is owned by the National Coal Board whose business has shrunk steadily over the past decade. Compower is also a bureau, but that side of the business, too, has taken a downward turn.

Howard Middleton, data processing manager, said: "We recruit one or two new members of staff a year and that's difficult to maintain. Our last new member was a programmer who joined us in the middle of last year."

Compower is obviously affected by events at the National Coal Board. And redundancies there make it difficult for Compower to carry on with recruitment. "We're under instructions to cut back," said Middleton.

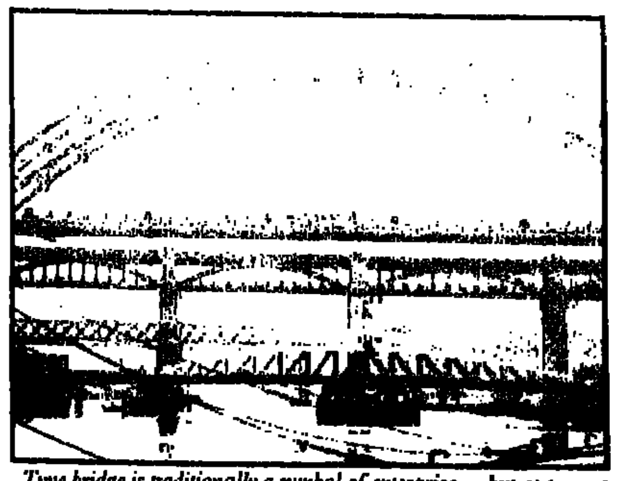
The problems on the bureau side of the business are more surprising. Middleton insists that the present bureau slump is not the start of something worse but is just a temporary effect of the recession.

There are nevertheless those in the industry who argue that bureaux, in their existing form at least, are a dying service.

Bureaux like Compower and especially those in the North, feel the recession as a double-edged sword.

"We do a lot of payroll work," said Middleton, "so if our customers lay off staff we have less work to do.

"We are picking up new business," he added, "but business is equalled by losses."


Tyne bridge is traditionally a symbol of enterprise – but at present those in the North-east are hanging on to the available jobs.

The reasons, he says, are client companies going bust and others going in-house by buying their own computer facilities.

British Steel has also told a sorry tale lately. "We're not recruiting at all," said DPM Tom Kelley. British Steel's computer centre is in Scunthorpe and the company's staff is shrinking. Staff are leaving at the rate of eight per cent in 12 months, according to Kelley.

But privately owned computer installations in the North are doing rather better than their public neighbours. A few weeks ago a Manchester software house, Management Control Systems, made public its desperate need for no less than 20 analysts and systems designers.

Managing director Eric Haworth, said he couldn't get hold of experienced staff.

The pharmaceutical firm TJ Smith and Nephew has vacancies now for programmers and analysts. As with most DP employers at present, the company is looking for trained staff, here with expertise in Honeywell equipment.

Smith and Nephew has just moved its computer operation from Welwyn Garden City to Hull and has combined two departments so the extra staff are needed as a result of internal changes.

Radius Computer Services, another Hull firm, is also after experienced software staff. Radius is mostly a systems house but does some bureau work as well.

The company's DP manager, Edward Sharp, says he has some trouble getting staff. But the problem has not been brought about by any shortage of applicants, rather a shortage of expertise.

Perpetrating the curse of the TOPS student and the recent graduate, Radius like the others, says it must have experienced programmers and analysts with at least two years behind them.

Hit hardest as they are by recession, employers in the North are not in a position to land themselves with inexperienced staff who may be expensive to train.

That is not to say that salaries for Northern computer staff are suffering. Companies like Radius are willing to pay more than £9,000 for two years' programming experience, but in the long term a good salary is probably cheaper than the costs in time and effort of training a newcomer – and with none of the risks concerning how that new member will turn out.

For companies like Radius in Hull, steady growth means a fairly constant demand for staff. Radius has increased its personnel from 20, two years ago, to 65 now.

But Sharp said: "Staff aren't easy to get here because they're not of the right quality. We get lots of applications from minimally qualified people."

How does a DP manager like Sharp decide when a would-be programmer is properly experienced?

"I ask applicants what they did at work last week," he explained, "and ask for the details of each day's work."

Applicants are set an aptitude test as well – a formal test, partly on programming skills.

It seems that job opportunities in the North exist almost exclusively for experienced software staff and only in the private sector.

Computer staff with less than two years' experience and particularly those starting out with none at all, will have to get themselves qualified in that respect in other parts of the country.

But a good point about working in the North is that salaries are substantial. This coupled with a lower cost of living than other more prosperous parts of the country, makes the move North a good idea for those with experience.

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HOUSING SERVICE
Computer Officer

Grade PO1B £10,818-£11,931 p.a. inc.

The Housing Service urgently requires an experienced person to develop and maintain computerised systems within the Department. The successful candidate will have responsibility for an extensive existing on-line network connected to an IBM mainframe owned jointly by the London Boroughs of Brent and Ealing. Liaison with the computer centre will be an important part of the postholder's work as with the acquisition of further hardware, either linked to the mainframe or independent of it, making recommendations as to software options, development of 'in-house' programmes and the training of staff.

Valuable experience would be in the following areas:

Local Authority Housing
Systems Analysis
Programming in High-level languages such as COBOL
Basic, Easytrieve, APL
Network Control
Training in Data processing

Obviously, the ideal candidate will have some experience in each of these fields but if in doubt about your experience or if you wish to know more about the job, informally, please telephone Mr Samek, or Mr McConnell on 903 1400 Ext 675, after you have obtained the Job Description.

As Brent is a multi-racial Borough, candidates will be expected to have the knowledge and experience of the problems arising from working in a multi-racial Community.

Brent is an Equal Opportunity Employer. Applications are welcome from candidates regardless of race, nationality, ethnic or national origins, age, marital status, sex, sexual orientation and from registered disabled persons.

Application forms and job descriptions from the Personnel Division, Room 708, Brent House, High Road, Wembley, Middlesex, returnable by 11 March, 1983. Telephone 01-903 0371 (24-hour Ansafone service). Reference number H/594 must be quoted.

London Borough of
BRENT

(2593)

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ATEX text processing systems for the publishing and printing industries are world leaders. With continuing growth, further field engineers are required to work with systems installed in central London, including national newspapers. The ideal candidates would have experience with multi-terminal, multi-CPU systems, PDP11 computers and CDC SMD disk drives.

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(2535)

CARMARTHEN DISTRICT COUNCIL

Applications are invited for the undermentioned post:

FINANCE DEPARTMENT

SYSTEMS ANALYST/PROGRAMMER

Salary Grade: A.P.3/4/5/S.O.1 – [illegible]

Required for new ME29 installation linked to the County Council ICL 2966. Applicants should have several years' experience in COBOL programming with recent experience of ME29 Hardware, TME-TP programming and CL reports writing, preferably in a local government environment.
Removal expenses will be paid and assistance with housing may be available.
The Council has a bi-lingual policy and a knowledge of Welsh would be an advantage.

Application forms and job description available from the Director of Personnel and Management Services, Council Offices, 3 Spilman Street, Carmarthen, Dyfed, SA31 1LE. (Telephone 4567 – Extension 228).
Completed forms to be returned by not later than 4 p.m., FRIDAY, MARCH 4, 1983.

[illegible]

SYSTEMS AND PROGRAMMING

IBM COBOL/CICS — To £11,500

Superb international financial organisation in the City need a keen and ambitious person with experience of IBM COBOL, and some CICS to join their development team. Your personality and ability to succeed will be as important as your present skills. A financial background would be a definite advantage, and you will be offered every opportunity to progress in your career.
Ref. C 2043

BURROUGHS — To £13,000

Do you have a professional outlook and attitude to DP., coupled with a minimum of 2 years' Burroughs programming and/or analysis experience? My client, a major, multi-national organisation based in the heart of Middlesex is seeking new staff at all levels due to expansion in the UK. You will become an integral part of a team involved in interesting and demanding development work, in the financial and commercial sectors. The position carries an excellent package and a defined career path.
Ref. A 1913

RPG/II/III ANALYST/PROGRAMMER — £10,000

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Ref. G 2149

UNIVAC — COBOL — To £9,500

Become part of this Kent based financial concern, as an Analyst/Programmer utilizing the very latest on-line and database techniques. All that is required of you is in excess of 18 months' UNIVAC 1100 experience, in any environment and a desire to gain new skills whilst developing brand new and exciting systems. The company offer training throughout your career and promotion prospects are ideal for the ambitious individual. Please phone now for fuller details.
Ref. A 2177

DEC PDP/VAX — To £10,000

There are currently positions available in Hampshire, Surrey and London to keen programmers and analyst/programmers who can offer at least 2 years' experience of DEC PDP or DEC VAX under RSTS/E, RSX 11-M or VMS, preferably with BASIC + or BASIC +2 experience. Experience of commercial, insurance or financial systems very useful. If you are interested in knowing more about these opportunities, please contact us now.
Ref. C 223A

SYSTEMS PROGRAMMERS (ALL LEVELS) — £8,000-£12,500

Vacancies currently exist within London and the Home Counties, from Junior (12 months + experience) to Senior level within a wide range of environments including consultancies, insurance, commercial and financial companies. IBM installations require knowledge of OS/MVS, DOS/VS(E), VM, CICS, ASSEMBLER, VTAM, NCP, VOLLIE. Please call for further information.
Ref. C 2814

ANALYST/PROGRAMMER — CITY — To £10,000 + Perks

Well established City stockbrokers have an urgent requirement for a competent analyst/programmer to take up a key position within their Data-Processing operations. You should be able to offer a minimum of 2 years' ICL COBOL, experience and exposure to either TME or DME and a working knowledge of MTS. You will be involved with a variety of new and exciting development projects, utilising their ME29. If you are an Analyst/Programmer seeking a rewarding and responsible career, CALL NOW for further details.
Ref. D 1928

MVS COBOL — CITY & CENTRAL — To £11,500

International companies in the City and the West End, involved in petroleum and shipping trades require 18 months' to 5 years' IBM experience coupled with MVS, and possibly knowledge of CICS and database for exciting development projects. A good educational background is required, together with the enthusiasm and desire to succeed and grow within the company. Excellent benefits.
Ref. C 1823

SYSTEMS ANALYST — SURREY/BERKS — £13,000 neg.

Exciting opportunity to work with new IBM 23 kit, in a project leader role. You should have sound analysis skills, preferably a COBOL background, and be capable of meeting clients, ascertaining requirements, specifying, designing and implementing new systems. Any machine experience will be considered, if you have the maturity and drive to cope with a busy bureau environment.
Ref. C 2178

NCR COBOL — CITY — C£10,000 + bank benefits

Can you offer 3/4 years' experience in COBOL, VRX and Database, if so then this International Bank would like to hear from you. They are looking for an ambitious Analyst/Programmer to take up a challenging position and become an integral part of their new development project. If you are an experienced Analyst/Programmer keen to take the first step towards management, call me now for further details.
Ref. D 1825

HONEYWELL — COBOL — To £10,000

An opportunity to move away from general commercial applications. If you can offer 18 months' + COBOL experience, preferably having worked with Honeywell equipment, hopefully with some exposure to TDS, the IDS, this London based organisation can offer you an interesting position. You will develop new and interesting systems using "State of the art" technology, playing an integral part in a small team using Honeywell L64/DPS4 equipment.
Ref. A 2027

IBM COBOL — BERKS — C £8,500

18 months' IBM COBOL experience, together with some knowledge of CMS, VSI, IMS or Easytrieve is required to join this well established financial institution in Berkshire. Become part of their expanding development team, where you will be rewarded with excellent salary, BUPA, life assurance etc.
Ref. C [illegible]

ICL PROGRAMMERS ANALYST/PROGRAMMERS — £6,000 — £12,000

Professional bureau organisation based Surrey/Middlesex borders is currently seeking to fill several newly created ICL positions for the new year. If you are a Junior Programmer with a minimum of 12 months' experience to ICL COBOL with either TME, DME or VME/B they can offer training facilities and excellent opportunities for career advancement. For more senior posts Analyst/Programmers with over 2 years' experience in an ICL COBOL environment with either TME, DME or VME/B, will be given the chance to utilise their skills to their full extent and take the first step towards management and a fulfilling career.
Ref. D [illegible]

IBM COBOL PROGRAMMER — £9,000

This prestigious insurance organisation, retaining an IBM 4341 running under OS/VMS, are looking for a programmer to join a small team on development projects. This is an ideal career advancement for a programmer with 12 months' IBM COBOL background, and the ability to succeed in a progressive environment. Benefits include free life assurance.
Ref. G 2191

PL/1 ANALYST/PROGRAMMER — CITY — C£11,500

Financial organisation based in the City are currently seeking to recruit an analyst/programmer with a minimum of 3 years' experience working within a financial environment using PL/1. The successful applicant will be a self-starter with the ability to lead and supervise a small team of programmers. You will be given every opportunity to utilise your skills to their full extent, and to improve your career prospects by taking the first step into management. Excellent salary and many company benefits.
Ref. D 220[illegible]

DEC-DIBOL — CITY — £8,000 + Perks

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RPF II — SOUTH EAST — C £8,500

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Ref. C 2156

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Ref. G 2197

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Ref. A 2019

IBM COBOL — HERTS — C£9,500

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Ref. G 2101

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IBM DOS/VS DL/1 CICS PL/1	PROGRAMMERS
IBM MVS IMS DB/DC COBOL	ANALYST/PROGRAMMERS
IBM DOS/VS DL/1 CICS COBOL	PROGRAMMERS
IBM FOCUS/CMS	PROGRAMMERS
IBM MVS	SYSTEMS PROGRAMMERS
IBM MVS TASKMASTER	SYSTEMS PROGRAMMERS
IBM SYSTEM 34 RPGII	PROGRAMMERS
IBM 8100 DPCX	PROGRAMMERS
IBM NOMAD DATABASE COBOL	ANALYST/PROGRAMMERS

OTHERS

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BURROUGHS CMS RJE/SYCOM NDL MPL GEMCOS	
VAX 11/780 SYSTEL	SYSTEMS PROGRAMMERS
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TOTAL DATABASE	SENIOR ANALYSTS
HP3000 IMAGE/VIEW COBOL	ANALYST/PROGRAMMERS
VAX VMS PASCAL	ANALYST/PROGRAMMERS
VAX VMS BASIC	ANALYST/PROGRAMMERS
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ICL

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Degree qualified engineers having several years design experience of low frequency analogue circuits RFI protection.

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(2557)

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London Borough of Tower Hamlets

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If you are interested but would like to know more about this post, then telephone Mr Hill, Director, on 01-980 44114, extension 212.

Application forms from Personnel Services, Town Hall, Patriot Square, London E2, or telephone 01-981 6077 (Ansafone). Closing date 7th March. Please quote reference TRA.

(2610)

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The need is for a graduate Engineer with at least 5 years' experience of software engineering — including the use of microprocessors. A background of system engineering as applied to radio paging formats would be ideal — but this is by no means essential.

A starting salary of up to £12,000 pa is enhanced by a package of large company benefits that includes assistance with relocation to the South East of England, where necessary. Career prospects are excellent in line with our client's policy of developing the skills of the individual and of promoting from within.

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Our current skill requirements include **Financial Planning, APL, CICS Assembler, SAS, CMS EXEC and RAMIS**, however we are more concerned with finding the right personalities whom we will then train as required.

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Miss T. Sparks, Integrated Business Systems Ltd, Lakeside Estate, Colnbrook By-Pass, Slough, Berks SL3 0EF. Tel: Slough (0753) 45112

(2585)

[illegible] MANAGER

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061-833 0427

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